Food Safety
AUTHORITY OF IRELAND

Best Practice for Infant Feeding in Ireland

From pre-conception through the first year of an infant's life

A guide for healthcare professionals based on

The Scientific Recommendations for a National Infant Feeding Policy, 2nd Edition (2011)

Everyone wants what's best for baby

This report is all about food and babies – providing essential guidance for healthcare professionals in Ireland.

Foreword

"It is recognised worldwide that the first 1,000 days of life - between conception and the child's 2nd birthday, offer a unique opportunity to shape healthier futures. The right nutrition at this time can have a profound impact on society, playing a critical role in obesity and chronic disease prevention.

During this period, complicated feeding methods and skills are required for best practice - especially from conception up to the end of the first year of life. Research in Ireland has shown that parents in Ireland want more practical food-based information to cover this important life-stage.

This guidance document offers practical advice on all aspects of food and nutrition from conception through the first year of life. All the information in this booklet is based on the *Scientific Recommendations for a National Infant Feeding Policy, 2nd Edition, 2011.*"

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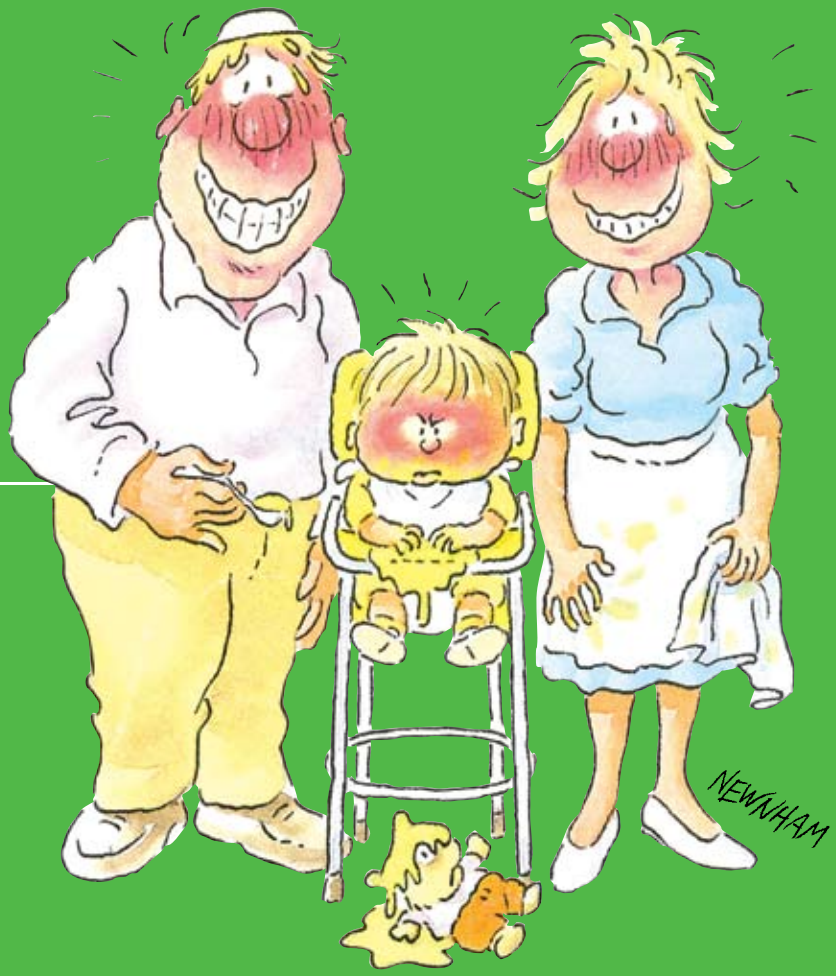

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Contents

Abbreviations

The following abbreviations are used regularly throughout this document:

BMI	Body Mass Index
DHA	Docosahexaenoic Acid
EDD	Estimated Date of Delivery
EFSA	European Food Safety Authority
EPA	Eicosapentaenoic Acid
GP	General Practitioner
HIV	Human Immunodeficiency Virus
HSE	Health Service Executive
IU	International Unit
NTD	Neural Tube Defect
OFC	Occipital-frontal Circumference
PHN	Public Health Nurse
PKU	Phenylketonuria
PUFAs	Polyunsaturated Fatty Acids
RDA	Recommended Dietary Allowance
SIDS	Sudden Infant Death Syndrome
TB	Tuberculosis
UK-WHO	United Kingdom-World Health Organization
UV	Ultraviolet

The Importance of Good Nutrition During Pre-conception, Pregnancy and the First Year of an Infant's Life

Maternal nutrition prior to and during pregnancy is important for the healthy development of the foetus and can help establish adequate nutritional stores at birth. Maternal nutrition during pregnancy may also have an impact on the health of the infant in later years.

The first year of life is a period of rapid growth and development. An infant's birth weight doubles by 6 months and triples by one year – a process not repeated at any other phase in the life cycle. Emerging evidence indicates that some chronic illnesses of adulthood, such as heart disease and diabetes, have their origins in this period of development. Therefore, the period from conception to two years of age is recognised as a critical time during which the food and nutrition habits established potentially influence lifelong health and well-being.

Breastfeeding is the agreed gold-standard in infant feeding. The Department of Health currently recommends that infants are exclusively breastfed for the first 6 months of life. Without question, breastfeeding should – first and foremost – continue to be protected and promoted in the interests of both maternal and infant health. However, with less than half of Irish mothers choosing to breastfeed on discharge from hospital, guidance on safe formula milk feeding must be provided to parents/carers who choose not to breastfeed.

From about 6 months of age, exclusive breast milk, or infant formula milk feeding, no longer meets the nutritional needs of the growing infant, necessitating the introduction of nutritious solid food. The introduction of solid food into an infant's diet is called weaning. This process occurs between about 6 and 12 months of age, and is recognised as a crucial dietary event in an infant's life. Throughout this process, food acceptance and taste preferences are learned and new skills and feeding patterns are developed. However, research has shown that a worrying proportion of 6-month-old Irish infants consume foods high in energy, saturated fats, salt and refined sugars – all practices which may negatively impact health in later life. Therefore, guidance is needed on: a) the appropriate time to wean an infant onto solid food and b) the types of foods that are recommended during the process of weaning.

Parents/carers have a vital role in fostering positive eating and lifestyle habits in their children from infancy. As such, clear and evidence-based guidance is needed on all aspects of infant feeding. Healthcare professionals must possess up-to-date information on best practice in infant feeding in order to provide such guidance to parents/carers. It is only with such information that parents/carers can make informed decisions in the best interests of their child's health.

A Practical Guide for Healthcare Professionals:

Timing the Provision of Health and Nutrition Information for Pre-conception, Pregnancy and throughout the Infant's First Year of Life

Information on:

Healthy eating during:
- Pregnancy
- Breastfeeding

Risks of formula feeding

Information on:

Breastfeeding

Safe infant formula feeding

Information on:

Correct time to introduce solids

Process of introducing solids

Information on:

Specific concerns on the process of introducing solid food

Information on:

Healthy eating for toddlers and the whole family

Pre-conception | Antenatal period | Birth to 6 Months | 6 Months | 7 – 9 Months | 9 – 12 Months | 12 Months

Key points:

Advise woman to take 400µg folic acid supplement daily prior to and during the first 12 weeks of pregnancy

Discuss the merits of breastfeeding over formula feeding

Discuss the correct time to wean an infant onto solid food

Key points:

Advise mother to breastfeed

If not possible to breastfeed, advise parents/carers to follow strict guidelines on the safe preparation of infant formula

Supplement infant with 5µg vitamin D daily

Introduce solid foods at about 6 months of age

Key points:

Advise parents/carers to progress through the 3 stages of weaning

Offer a wide variety of nutritious foods and different flavours to the infant

Introduce a lidded beaker or cup for all fluids, other than breastfeeds and aim to use a non-lidded beaker by 12 months of age

Continue to supplement infant with 5µg vitamin D daily

Key points:

Feed the infant as per the normal family routine

Involve the whole family in healthy eating to create a positive example for the infant

chapter 1

Nutrition and Lifestyle before and during Pregnancy

1.1 Nutrition and Lifestyle before Pregnancy

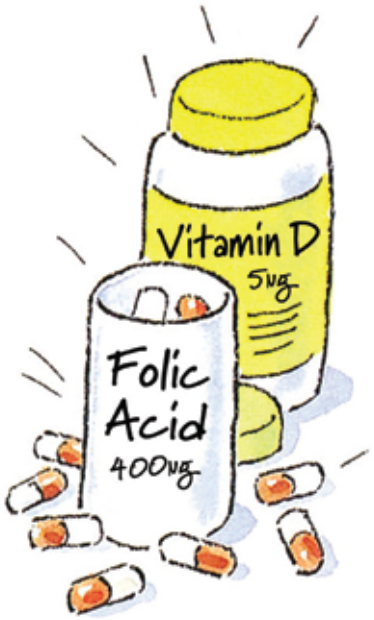
A healthy and balanced diet is important for good health throughout all stages of life. A healthy and balanced diet helps ensure that in the event of pregnancy, a woman of childbearing age will be in good health throughout the pregnancy and will be able to provide the unborn infant with the nutrition needed to develop properly.

Women of childbearing age should aim to consume a nutritionally adequate diet. Such a diet should contain foods from the five main foods groups every day. A supplement of 400µg folic acid should be taken daily to help prevent neural tube defects (NTDs) in infants. Healthcare professionals should provide information on:

- Maintaining a healthy body weight
- Not smoking/smoking cessation
- The weekly alcohol limits for women

  Women should be advised **not to consume more than 11 units** (approximately 110g alcohol) spread over a week. A unit is a rough measure of the amount of drink that will provide about 10g alcohol, e.g. ½ pint beer (284ml), pub measure of spirits (35.5ml), or a small glass of wine (100ml).

The new Food Pyramid from "Healthy Eating and Active Living for Adults, Teenagers and Children over 5 years – A Food Guide for Health Professionals and Catering Services".



Healthy eating guidelines for women of childbearing age

- Enjoy a wide variety of foods from the five food groups (See Food Pyramid below)
- Pay attention to serving sizes - choose smaller portions and add plenty of vegetables, salad and fruit.
- Include wholemeal breads, cereals, potatoes, pasta and rice to provide energy for a healthy weight.
- Eat at least five servings of different coloured fruit and vegetables every day.
- Use low-fat varieties of milk, yoghurt and cheese - choose milk and yoghurt more often than cheese.
- Include lean meat, poultry and fish (oily is best) daily, and remember that peas, beans and lentils are good alternatives.
- Use polyunsaturated and monounsaturated spreads and oils sparingly – reduced-fat spreads are best.
- Healthy eating can be enjoyed without foods like confectionery, savoury snacks, and biscuits – these foods are rich in calories, fat, sugar and salt and need to be limited.
- Drink plenty of water.

Healthy cooking practices

- Grill, bake, steam or boil food instead of frying or deep frying.
- Prepare and store food safely.
- Limit salt intake - Use fruit to make tasty sauces for meat and poultry, e.g. apple or cranberry sauce and flavour food with pepper, herbs and spices, lemon juice, vinegar.

Vitamin D

Vitamin D is needed for strong healthy bones and may protect against heart disease and cancer. Most people do not get enough vitamin D. Choosing oily fish one to two times a week is the best way to get vitamin D. Taking a daily vitamin D supplement is another way of getting vitamin D. The best choice is to take a vitamin D supplement of 5µg (200 IU) every day.

Active Living

Being active for adults means taking part in at least 30 minutes of moderate to vigorous activities such as walking, running, cycling, swimming, Gaelic games, rugby, football, basketball, or dancing, on at least 5 days a week.

The importance of folic acid supplementation before pregnancy

Folate is a B-vitamin found naturally in some foods such as green leafy vegetables. Folic acid is the synthetic form of folate which is used to fortify some foods such as breakfast cereals and milk, and is found in some food supplements. It is difficult to get the recommended amount of folate from the diet alone. This is why a folic acid supplement is recommended.

The neural tube becomes the brain and spinal cord in humans, and is therefore essential to the correct development of the nervous system. A sufficient level of folic acid is required to ensure the neural tube closes correctly. Incorrect closure of the neural tube causes NTDs in the infant.

NTDs, such as *Spina Bifida*, are severe abnormalities of the brain and spine which can develop in a foetus between days 21 and 28 after conception. A woman may only begin to suspect a pregnancy around this time. Therefore, sexually active women of childbearing age should be advised to take a daily supplement of 400µg folic acid in preparation for a possible unplanned pregnancy. This supplementation should continue for the first 12 weeks of pregnancy.

Recent research in Ireland has shown that although most pregnant women take folic acid supplements, many do not take folic acid supplements in time to prevent NTDs. Therefore, it is imperative that healthcare professionals encourage all women of childbearing age to develop the habit of taking a folic acid supplement daily.

Over half of all pregnancies in Ireland are unplanned.

As such, it is important that healthcare professionals recognise this vulnerability in women of childbearing age, and tailor their health-related advice accordingly.

Up to 70% of all neural tube defects can be prevented by taking a 400µg folic acid supplement for at least 4 weeks prior to conception and during the first 12 weeks of pregnancy.

What is the bottom line in terms of nutrition and lifestyle before pregnancy?

1. *Advice on healthy eating and lifestyle and how to maintain a healthy weight should be provided to all women of childbearing age.*

   This will help ensure that the mother provides the best possible environment for her infant if she becomes pregnant.

2. *Women of childbearing age should be advised to take a* ***daily supplement of 400µg folic*** *acid to prevent NTDs.*

   This is especially important for at least 4 weeks prior to conception and during the first 12 weeks of pregnancy.

3. *Women who have given birth to an infant with a neural tube defect should be prescribed a high-dose daily supplement containing 4,000µg (4mg) folic acid.*

   Women who have had an infant with a NTD should be prescribed a daily **4,000µg** (4mg) folic acid supplement at least 4 weeks prior to conception and for the first 16 weeks of pregnancy to help prevent recurrence.

4. *Dietary sources of folate are important.*

   In addition to taking a folic acid supplement, women should also be advised to eat foods fortified with folic acid (such as fortified breakfast cereals and fortified milk) and high folate foods (such as green leafy vegetables).

Further Information

- FSAI 2011, *Scientific Recommendations for Healthy Eating Guidelines in Ireland*
  www.fsai.ie
- FSAI 2012, *Healthy Eating and Active Living for Adults, Teenagers and Children over 5 years – A Food Guide for Health Professionals and Catering Services*
  www.fsai.ie
- INDI 2005, *Planning a Pregnancy: Good Nutrition for Preconception*
  www.indi.ie

1.2 Good Nutrition for a Healthy Pregnancy

Healthy eating is important for pregnant women

A healthy and balanced diet during pregnancy helps to ensure that:

- Women have the nutrients needed for good health during and after pregnancy, and;
- Infants have the best possible environment in which to grow and develop

The time an infant spends developing in the womb is critically important and can influence health throughout adult life. Evidence suggests that many diseases common in later life such as heart disease and diabetes, may have their root in this period of early development.

What is a healthy diet during pregnancy?

During pregnancy, a healthy and balanced diet can be achieved by following the healthy eating guidelines for women in Ireland (FSAI 2012, *Healthy Eating and Active Living for Adults, Teenagers and Children over 5 years* - A Food Guide for Health Professionals and Catering Services). The 5 main food groups which provide the nutrients needed for a healthy pregnancy are:

- **Breads, cereals and potatoes** – choose wholegrain and wholemeal more often
- **Fruit and vegetables** – choose at least 5 a day and vary the types chosen
- **Milk and milk products** – choose low-fat milk and yoghurt more often than cheese
- **Meat, fish, chicken and alternatives** – choose lean cuts of meat
- **Fats and oils** – use sparingly

Certain nutrients are particularly important to help protect a mother's health and to promote the healthy development of an infant. To include these nutrients in the diet, pregnant women should prioritise the consumption of foods rich in **iron, calcium, vitamin D**, and **long chain omega-3 polyunsaturated fatty acids**. Each of these nutrients is discussed in detail on the following pages.

The importance of folic acid supplementation during the first 12 weeks of pregnancy

Pregnant women should take a folic acid supplement of 400µg per day during the first 12 weeks of pregnancy to help prevent NTDs in the infant. If a mother has previously had an infant with an NTD, a supplement containing 4,000ug of folic acid is required per day to help prevent recurrence. See page 5 for further information on folic acid.

Foods rich in iron are important during pregnancy

Why is iron important during pregnancy?

Iron is involved in the transport of oxygen to the developing foetus and helps to protect the health of a pregnant woman. A pregnant woman's body adapts to absorb more iron from the diet; however, it is still essential that there is sufficient iron in the diet to support both the mother and the developing foetus.

How can a pregnant woman get enough iron from her diet?

Pregnant women need to consume a total of 15mg of iron from their meals every day. Pregnant women should aim to eat iron-rich foods twice daily. Examples of suitable food sources of iron are found in Table 1.

Dietary iron exists in *haem* and **non-haem** forms.

Haem iron

Haem iron is more easily absorbed by the body and the best source is red meat such as beef, lamb, mutton and pork.

Despite its high iron content, it is important to note that liver is not recommended for pregnant women due to its high vitamin A content. High maternal vitamin A intake during pregnancy can be harmful to the developing foetus.

Non-haem iron

Non-haem iron is less well absorbed by the body. It is found in eggs, green leafy vegetables, pulses and foods fortified with iron.

What foods and fluids increase the amount of iron absorbed by the body?

Consuming a source of vitamin C with a meal containing non-haem iron will improve the amount of iron absorbed by the body. Sources of vitamin C include fresh fruits (such as oranges, lemons, kiwis, strawberries and limes), fruit juices made from these and fresh vegetables (such as broccoli, peppers, cauliflower and kale).

What foods and fluids decrease the amount of iron absorbed by the body?

Consuming a source of tannins or phytates with a meal containing iron will decrease the amount of iron absorbed by the body. Sources of tannins include tea and coffee, and sources of phytates include very high-fibre foods such as bran and high-fibre cereals.

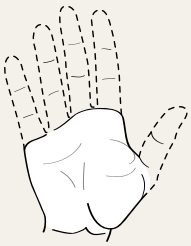
Table 1. Amount of Iron in Commonly Eaten Foods

Foods rich in more easily absorbed HAEM IRON	Serving size (g)	Iron content (mg)
RECOMMENDED RED MEAT		
Average portion* of lean beef	120	3.2
Average portion* of lean beef mince (stewed)	120	2.8
Average portion* of lean lamb cutlets	120	2.5
Average portion* of pork chops	120	1.6
POULTRY		
Average* chicken breast	120	1.3
FISH		
1 small tin of sardines (canned in brine)	70	1.6
1 small tin of salmon	70	0.4
Average portion* of cod	120	0.5
OTHER		
2 small slices of black pudding	60	12

Foods rich in less easily absorbed NON-HAEM IRON	Serving size (g)	Iron content (mg)
1 cup** of fortified breakfast cereal	30	2.4 – 4.2
1 small can of baked beans	140	1.9
1 cup** of boiled spinach	90	1.4
1 boiled egg	50	1
1 slice of wholemeal bread	36	0.9
1 cup** of boiled broccoli	85	0.9
¼ cup of dried fruit	25	0.6

See below: Portion Size Reference Guide - Palm of hand * and 200ml disposable cup**

PORTION SIZE REFERENCE GUIDE



Palm of the hand*

The width and depth of your palm (without fingers and thumb) shows how much meat, poultry or fish you need in a day. Most of this can be used for your main meal, with the remainder for your light meal.

200ml Disposable Cup**

Use a disposable plastic cup to guide portion sizes of milk, milk puddings, cereals, cooked pasta and rice, and even vegetables, salad and fruit.

What about iron supplementation during pregnancy?

Pregnant women can find it difficult to meet their iron requirements from diet alone, and in such cases, an iron supplement may be needed. However, women can experience uncomfortable gastrointestinal side effects such as constipation when they are taking iron supplements. The healthcare professional leading the care of the pregnancy should advise accordingly.

Haemochromatosis

Celtic populations such as the Irish population are more prone to the iron overload disorder known as haemochromatosis compared with other populations. Individuals with haemochromatosis should not consume large amounts of dietary iron and should avoid iron supplements. Therefore, the family history of haemochromatosis should be determined before advising a woman about taking iron supplements.

Foods rich in calcium are important during pregnancy

Why is calcium important during pregnancy?

Calcium is necessary to protect the bone health of the mother and to provide the developing foetus with the calcium needed for the healthy development of their skeleton. Although the requirement for calcium does not increase during pregnancy (because of pregnancy induced adaptations to maternal calcium homeostasis), many women do not reach the recommended daily intake.

Pregnant adult women require **1,000mg calcium** every day. Pregnant teenage girls require **1,300mg calcium** every day.

How can a pregnant woman get enough calcium from her diet?

Milk and milk-based products are excellent sources of calcium. To achieve the recommended daily intake of 1,000mg calcium, pregnant adult women should consume at least three portions of milk or milk-based products (Table 2) every day. Consuming products fortified with calcium will contribute to this recommended daily intake.

For lactose intolerant pregnant women or those who avoid dairy foods, soy-based products fortified with calcium should be included in the diet.

Foods which contain calcium in a form that is less easily absorbed by the body can be included as part of a varied diet, but should not be relied upon to provide all the calcium a pregnant woman needs. These include foods such as spinach, sweet potatoes, rhubarb, beans, unleavened bread, seeds and nuts.

Foods such as milk, milk-based products, and soy-based products contain calcium in a form that is easily absorbed by the body.

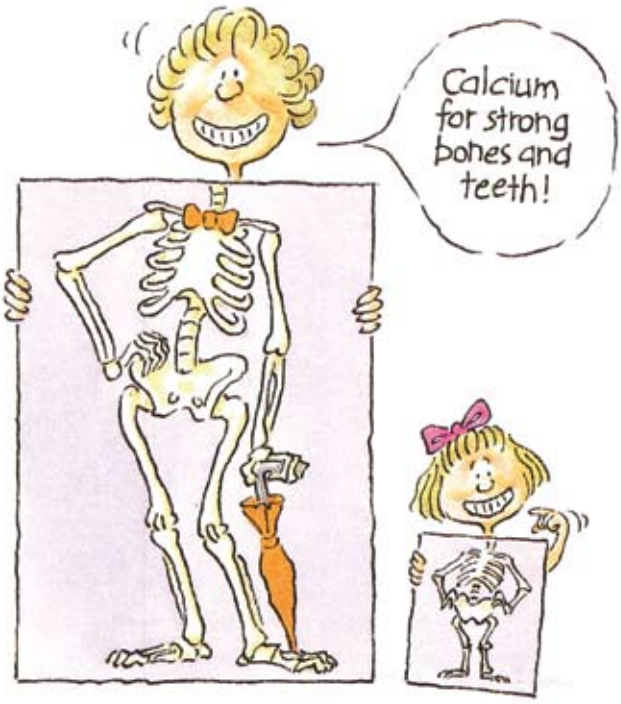
These foods should be prioritised for their calcium content and included in the daily diet.

Table 2. Amount of Calcium in Commonly Eaten Foods

Calcium-containing foods	Serving size (g)	Calcium content (mg)
1 tin of sardines (canned in oil, drained)	70	350
1 pot of yoghurt	125	260
Average portion* of calcium fortified set tofu	120	300
1 cup** of milk pudding with skimmed milk	200	260
1 pot of fortified soy yoghurt	125	208
1 matchbox size piece of cheddar cheese	30	220
1 cup** of rice pudding with skimmed milk	200	170
1 pot of unfortified soy yoghurt	125	Trace

Calcium-containing fluids	Serving size (ml)	Calcium content (mg)
1 cup** of fortified low-fat milk	200	332
1 cup** of whole milk	200	240
1 cup** of semi-skimmed milk	200	240
1 cup** of skimmed milk	200	240
1 cup** of fortified soy milk	200	178

See page 7: Portion Size Reference Guide - Palm of hand* and 200ml disposable cup**



DID YOU KNOW?

Fish such as canned sardines have small edible bones which are a rich source of calcium.

What about calcium supplementation during pregnancy?

Pregnant women should be encouraged to meet recommended intakes of calcium through the diet. However, for women who don't like milk or milk-based products, who are vegan, lactose intolerant, those who do not include calcium enriched soy or non dairy foods, or who find it difficult to consume enough calcium rich foods in their daily diet, a calcium supplement may be needed.

High intakes of calcium can reduce the absorption of other essential minerals such as iron. Therefore, it is important to encourage women to meet, but not exceed, their calcium requirements. Calcium supplements should only **be advised where there is a clear need**.

The body can absorb calcium best from a calcium supplement when:

- It is broken down
- Taken with a meal
- The dose is 500mg calcium or less and
- It is not taken with an iron supplement

Foods rich in vitamin D are important during pregnancy

Why is vitamin D important during pregnancy?

Vitamin D is important during pregnancy since the vitamin D intake and stores of a mother determine her developing foetus's stores of vitamin D at birth. Vitamin D is needed to help absorb calcium in the body and therefore is essential for good bone health. Low levels of vitamin D have also been linked with increased risk of heart disease, diabetes and the metabolic syndrome.

Vitamin D is manufactured when the skin is exposed to ultraviolet (UV) light from the sun's rays. However, in countries above a latitude of 40°N such as Ireland, vitamin D_3 cannot be made in the skin from October to March because the UV light (of the wavelength) that is able to promote vitamin D synthesis cannot penetrate the atmosphere during this time.

Pregnant adult women require 10µg (400 IU) vitamin D every day.

How can a pregnant woman get enough vitamin D from her diet?

Vitamin D is found naturally in only a few foods, including oily fish, some fish liver oils, some fortified cereals and fortified milks.

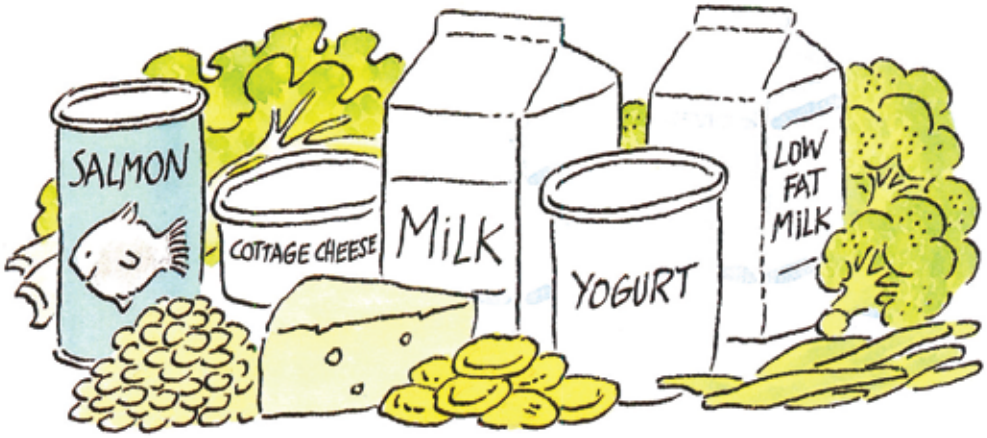


Table 3. Amount of Vitamin D in Commonly Eaten Foods

Vitamin D-containing foods	Serving size (g)	Vitamin D content (µg)
Average portion* herring, grilled	120	13.1
Average portion* mackerel, grilled	120	10.5
1 small tin of salmon	70	9.1
1 small tin of sardines (canned in oil or tomato sauce)	70	5.6
Average portion* of salmon steak, grilled	120	8.4
1 small tin of tuna† (canned in oil or brine)	70	2.3
1 egg, boiled	50	1
1 single portion pack of fortified margarine***	10	0.8

Vitamin D-containing fluids	Serving size (ml)	Vitamin D content (µg)
1 cup** of fortified milk	200	2.0
1 cup** of Supermilk® (whole and low-fat)	200	4.0

† Limit tuna intake to one fresh tuna steak (≤150g) or two 240g cans of tinned tuna per week during pregnancy due to mercury content

See page 7: Portion Size Reference Guide - Palm of hand* and 200ml disposable cup**

See page 11: Portion Size Reference Guide - Portion pack***

While liver contains vitamin D, it should not be consumed by pregnant women because it contains high levels of vitamin A.

See page 11, 'Vitamin A during pregnancy', for further information.

One of the richest sources of omega-3 fatty acids in the diet is oily fish, examples of which include salmon, mackerel, herring, sardines, pilchards, kippers and trout.

What about vitamin D supplementation during pregnancy?

Women should be encouraged to include vitamin D rich foods such as oily fish in their diet to meet requirements. However, if a woman does not include these sources in her diet and is considering taking a supplement, a low dose supplement containing 5ug of vitamin D_3 per day should be advised.

WARNING!

If a woman is taking a pregnancy multivitamin supplement she is already getting enough vitamin D. Women should be advised not to "double up" by taking additional supplements.

Foods rich in long chain omega-3 polyunsaturated fatty acids are important during pregnancy

Why are long chain omega-3 polyunsaturated fatty acids important during pregnancy?

Two important long chain omega-3 polyunsaturated fatty acids are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fatty acids play an important role in slowing down blood clot formation and are protective against heart disease in the mother. DHA in particular is thought to be important for a developing foetus, since it is an essential component of the brain, nervous system and retinas of the eyes.

How can a pregnant woman get enough long chain omega-3 polyunsaturated fatty acids from her diet?

The human body has a very limited ability to make these long chain omega-3 fatty acids. Therefore, it is critical that these fatty acids are included in the diet. The European Food Safety Authority (EFSA) recommends that all pregnant women consume an additional 700-1,400mg DHA per week. This is recommended in addition to the requirement of 1,750mg combined EPA and DHA per week.

Pregnant women can achieve this recommendation for increased DHA intake by consuming 1-2 portions of oily fish per week (Table 4).

For vegetarians, or those who do not eat fish, sources of alpha-linolenic acid (ALA) can be included in the diet, e.g. some vegetable foods such linseeds, rapeseed oil and walnuts. A small proportion of ALA can be converted by the body to EPA and, to a lesser extent, DHA. Because only a small amount of ALA is converted to EPA and DHA, oily fish is very valuable in the diet. Apart from oily fish, the only natural sources of EPA and DHA are human breast milk and cultivated marine algae.

Table 4. DHA content of an average portion of oily fish (150g) commonly consumed in Ireland

Omega-3-containing fish	Serving size (g)	DHA content (mg)
Average portion* of tuna steak†	120	2,749
Average portion* of salmon	120	2,485
Average portion* of mackerel	120	1,507
Average portion* herring kippered	120	902
Average portion* of Rainbow trout	120	641
1 small tin of tuna†	70	47.2

† Limit tuna intake to one fresh tuna steak (≤150 g) or two 240 g cans of tinned tuna per week during pregnancy due to mercury content

See page 7: Portion Size Reference Guide - Palm of hand* and 200ml disposable cup**

See below: Portion Size Reference Guide - Portion pack***

How much fish can be eaten during pregnancy?

Fish is a very important part of a healthy balanced diet and pregnant women should be encouraged to include fish as part of their weekly diet. However, certain types of fish can contain contaminants, e.g. mercury, which may be harmful to the brain of the developing foetus.

WARNING!

Larger fish contain more contaminants than other fish.

Therefore, pregnant women should avoid eating marlin, shark, ray and swordfish, and should limit their consumption of tuna to one serving of fresh tuna (150g) per week, or two 240g cans of tinned tuna per week.

What about long chain polyunsaturated omega-3 fatty acid supplementation during pregnancy?

Pregnant women should be encouraged to meet their intake requirements for these fatty acids through their diet. However, a supplement may be needed for women who do not like oily fish, who are vegan, or who find it difficult to consume enough omega-3 rich foods in their daily diet.

Women should be advised to take an omega-3 and omega-6 supplement or a pregnancy-specific supplement in order to avoid excessive intakes of other vitamins, such as vitamin A.

Vitamin A during pregnancy

Why is vitamin A important during pregnancy?

Vitamin A, also called retinol, is a fat-soluble vitamin which helps to strengthen immunity against infections. Vitamin A is involved in the maintenance of healthy skin and mucus linings, e.g. in the nose, and improves vision in dim light. It is also important for the development of the foetus.

During pregnancy, the recommended daily intake of vitamin A is 700µg. A healthy and balanced diet provides sufficient vitamin A for pregnant women.

How can a pregnant woman get enough vitamin A from her diet?

A woman eating a varied diet will easily achieve this. Good sources include whole milk (vitamin A is a fat soluble vitamin), cheese, eggs and some fortified milks and cereals (Table 5).

Table 5. The Vitamin A Content of Commonly Eaten Foods in Ireland

Type of food	Serving size (g)	Vitamin A content (µg)
1 matchbox size piece of cheddar cheese	30	109
1 single portion pack*** of butter	10	96
1 boiled egg	50	90
1 pot of full-fat plain yoghurt	125	45

See below: Portion Size Reference Guide-Portion pack***

PORTION SIZE REFERENCE GUIDE

Portion Pack***

Portions of butter or spread found in cafés can guide the amount to use. For example, one pat of fat spread is more than enough for one slice of bread – try and make it do for two. Reduced fat polyunsaturated and monounsaturated spreads are best.

WARNING!

Very high amounts of vitamin A (greater than 7,000µg/day, which is more than 10 times greater than the requirement for pregnant women) may harm the developing foetus. Some foods such as liver and liver products naturally contain very high amounts of vitamin A and pregnant women need to avoid these foods.

note

A note on carotene

Carotene is a dietary precursor of vitamin A. Dietary sources of carotene include brightly coloured vegetables like carrots, peas, broccoli, red peppers and spinach. Unlike foods naturally very high in vitamin A, such as liver and liver products, it is impossible to get too much vitamin A by consuming these dietary sources of carotene.

What about vitamin A supplementation during pregnancy?

If a pregnant women wishes to take a multivitamin, they should choose one designed especially for pregnancy. Certain 'standard' supplements and fish liver products such as cod liver oil are high in vitamin A, and these should be avoided during pregnancy.

Supplements designed especially for pregnancy tend to be lower in vitamin A than other supplements on the market and are safer for pregnant women. Supplements taken should not contain more than 100% of the recommended dietary allowance (RDA) for vitamin A in women.

Allergy during Pregnancy

If a woman is not allergic to a particular food or ingredient, there is no good evidence to suggest that avoiding certain foods during pregnancy protects an infant from developing food allergies later in life. However, if there is a strong history of nut allergy in the family, it may be advisable to avoid peanuts.

Care should be taken that the woman does not consume a food to which she herself is allergic.

Therefore, pregnant women do not need to avoid potentially allergenic foods during pregnancy, e.g. eggs, fish, milk or milk products, unless they themselves are allergic to these foods.

What is the bottom line in terms of good nutrition for a healthy pregnancy?

1. ***Folic acid*** *is important during the first 12 weeks of pregnancy.*

   Pregnant women should take a folic acid supplement of 400µg per day during the first 12 weeks of pregnancy. If a mother has previously had an infant with a NTD, a supplement containing 4,000µg of folic acid is required per day to help prevent recurrence.

2. ***Iron*** *is important all throughout pregnancy.*

   Pregnant women should aim to eat iron-rich foods such as those listed on page 7 twice daily.

3. ***Calcium*** *is important all throughout pregnancy.*

   Three servings of milk or milk products daily should be eaten, such as those listed on page 8.

4. ***Vitamin D*** *is important all throughout pregnancy.*

   Pregnant women should be encouraged to eat vitamin D rich foods, such as those listed on page 10. However, if a woman does not include these sources in her diet and is considering taking a supplement, a low dose supplement containing 5µg of vitamin D_3 per day should be advised.

5. *Consumption of **oily fish** should be encouraged throughout pregnancy.*

   Consumption of oily fish, such as those listed on page 11, is recommended all throughout pregnancy to provide essential long chain polyunsaturated omega-3 fatty acids in the diet. However, large fish can contain substances which may harm the developing foetus. As such, pregnant women should avoid eating marlin, shark, ray and swordfish, and should limit tuna to one serving of fresh tuna (150g) per week, or two 240g servings of canned tuna per week.

6. ***Excess vitamin A** is harmful during pregnancy.*

   Pregnant women should avoid liver and liver products as these are too high in vitamin A. Frequently eating these products may lead to the woman taking too much vitamin A in her diet which may be harmful to the developing foetus. Pregnant women should be encouraged to eat other sources of vitamin A such as those listed on page 11.

7. *Any **multivitamin** recommended should be specific to the needs of pregnant women.*

   If a supplement is deemed necessary, pregnant women should be advised to only take supplements which are specifically designed for pregnancy.

8. *Potentially **allergenic foods** should not be avoided unless the mother herself has an allergy.*

   Pregnant women do not need to avoid potentially allergenic foods during pregnancy, e.g. eggs, fish, milk or milk products, unless they themselves are allergic to these foods.

Further information

- HSE 2006, *Healthy Eating for Pregnancy* – www.healthpromotion.ie
- *Healthy Pregnancy,* Pack of 4 booklets on a range of topics related to healthy pregnancy is available to order online at www.healthpromotion.ie. This pack includes a pregnancy calendar and three booklets: *Give your baby a breather, Healthy Eating for Pregnancy and Feeding your baby.*
- HSE supported multimedia information resource for expectant and new mothers – www.whatsupmum.ie

1.3 Lifestyle Factors which are Important for a Healthy Pregnancy

A healthy weight is important during pregnancy

An underweight pregnant woman has an increased risk of a pre-term delivery and of delivering an infant of low birth-weight or very low birth-weight. An overweight or obese pregnant woman has an increased risk of delivering an infant with complications such as macrosomia (excessive birth weight), neonatal infection, hypoglycaemia and respiratory distress, in addition to a greater risk of obesity in later childhood. An overweight or obese mother also has a higher risk of gestational diabetes and hypertension during pregnancy, and of miscarriage or caesarean section.

It is easier for a woman to maintain a healthy weight during pregnancy if she is a healthy weight before pregnancy. Obesity affects over a fifth of adult women in Ireland today. Therefore, all healthcare professionals should play a role in encouraging all women of childbearing age to attain and maintain a healthy weight.

How much weight should a woman gain during pregnancy?

Deliberate attempts to decrease body weight are not recommended during pregnancy. Instead, women who are overweight or obese before pregnancy should aim to gain less weight than is normally expected during pregnancy and women who are underweight before pregnancy should aim to gain a little more weight than is normally expected during pregnancy. Pregnancy weight gain goals are to be used as a guide to the weight gain pattern observed during pregnancy (**Table 6**). The healthcare professional leading the care of the pregnant mother may be best placed to give specific advice on weight gain during pregnancy.

Calculating Body Mass Index (BMI)

Divide weight (kilograms) by height (in metres) squared:

$$\text{BMI (kg/m}^2) = \frac{\text{Weight (kg)}}{\text{Height (metres)} \times \text{Height (metres)}}$$

Table 6. Pregnancy Weight Gain Goals Based on Pre-Pregnancy Body Mass Index (BMI)

	Total weight gain		Rate of weight gain* 2nd and 3rd trimester	
Pre-pregnancy BMI	**Range (kg)**	**Range (lbs)**	**Mean (range) kg/week**	**Mean (range) lbs/week**
Underweight <18.5kg/m²	12.5 – 18.0	28-40	0.51 (0.44 – 0.58)	1.0 (1.0 - 1.3)
Normal weight 18.5-24.9kg/m²	11.5 – 16.0	25-35	0.42 (0.35 – 0.50)	1.0 (0.8 - 1.0)
Overweight 25.0-29.9kg/m²	7.0 – 11.5	15-25	0.28 (0.23 – 0.33)	0.5 (0.4 - 0.6)
Obese ≥30kg/m²	5.0 – 9.0	11-20	0.22 (0.17 – 0.27)	0.5 (0.4 - 0.6)

* Calculations assume a 0.5 – 2.0kg (1.1 – 4.4lbs) weight gain in the first trimester. Adapted from *Weight Gain during Pregnancy*, National Academy of Science, 2009

Women build up some fat stores during pregnancy to ensure they have sufficient energy stores for breastfeeding. This is accounted for in the guidelines provided above (Table 6).

1.3.1 What to eat for healthy weight gain during pregnancy

There is a modest increase in a woman's energy requirements, i.e. the amount of calories required daily **throughout pregnancy**.

Table 7. The Number of Additional Calories* needed by Pregnant Women during each Trimester of Pregnancy

Trimester of pregnancy	Additional calories to be consumed daily (kcal/d)
1st Trimester	0
2nd Trimester	350
3rd Trimester	500

* An average adult female requires about 2,000kcal/day

When choosing foods to meet the modest increase in energy requirements, preference should be given to foods rich in essential vitamins and minerals, such as fruits and vegetables, milk and milk products, and oily fish. See Table 8 for suitable foods which can be consumed (1-2 extra healthy snacks per day) to achieve the increased intake in energy during the second and third trimesters of pregnancy.

Table 8. The Number of Calories in Suitable Snacks for Pregnancy

Suitable snack food	Serving size (g)	Calories (kcal)
Soda bread: 1 slice (with honey)	43 (10)	100 (29)
1 cup** of bran cereal	30	134
2 slices of wholemeal toast (cheddar cheese and tomato)	70 (30 of cheese and 50 of tomato)	160 (208 cheese and 0 tomato)
1 small can of baked beans	140	111
Scrambled eggs (2 eggs, no milk)	120	192
1 pot low-fat plain yoghurt	125	71
1 cup** of fortified low-fat milk	200	84
1 cup** of fortified full-fat milk	200	120
1 small tin of tuna (canned in brine)	70	80.5
1 small tin of salmon (canned in brine, drained)	70	105
1 fruit, e.g. banana, apple, or 2 mandarin oranges	100	95

See page 7: Portion Size Reference Guide - Palm of hand* and 200ml disposable cup**

Caffeine and pregnancy

Caffeine can be absorbed freely across the placenta, but is not broken down by either the placenta or foetus. Caffeine consumption in excess of 200mg per day has been shown to have negative effects on an infant's birth weight, even in non-smokers. Therefore, pregnant women should keep their caffeine intake below 200mg caffeine per day. See Table 9 for the caffeine content of frequently consumed foods and drinks.

Table 9. Caffeine Content of Frequently Consumed Drinks and Foods

Caffeine-containing Drinks	Serving size (ml)	Caffeine content* (mg)
1 cup of brewed coffee	200	40 – 180
1 cup of instant coffee	200	30 – 120
1 bottle of cola	500	50 – 107
1 shot of espresso	30	29 – 92
1 bottle of diet cola	500	39 – 64
1 cup of tea	200	19 – 21
1 cup of decaffeinated coffee	200	4 – 12
1 can of stimulant energy drink	230	0.15 – 88.0

Caffeine-containing Foods	Serving size (g)	Caffeine content* (mg)
1 bar of dark chocolate	45	31 – 41

* The exact amount of caffeine varies according to cup size, brewing methods and brands of tea or coffee.

Smoking and pregnancy

Smoking is harmful to the developing foetus and is well-known to adversely affect foetal growth. Pregnant women who smoke have an increased risk of giving birth to infants with a low birth weight and with an increased risk of asthma. Pregnant women should be strongly advised not to smoke during pregnancy due to the harm caused to the developing foetus. Pregnant women should also be advised to avoid exposure to second-hand smoke.

Alcohol and pregnancy

No amount of alcohol is safe during pregnancy. Alcohol harms the developing foetus and increases the risk of miscarriage and pre-term delivery. Pregnant women should avoid all alcoholic drinks.

Food safety and hygiene

Good food preparation and hygiene practices are important at all stages of life in order to prevent potentially harmful foodborne illnesses. However, during pregnancy, this is particularly important, as certain bacteria in food (such as *Listeria* and *Salmonella*), or parasites (such as *Toxoplasma gondii*) can be extremely harmful to the developing foetus.

Listeria Monocytogenes

Listeria monocytogenes is a pathogenic bacterium which causes listeriosis. This bacterium is ubiquitous in the environment. The consumption of contaminated food is the main route by which listeriosis is transmitted (80-90% of cases).

Invasive listeriosis affects high-risk individuals such as pregnant women and the developing foetus. Listeriosis is characterised by diarrhoea, headache, fever, muscle pain, meningitis and septicaemia, as well as spontaneous abortion.

Listeria monocytogenes is particularly dangerous to high-risk individuals because it can grow at fridge temperatures. Fortunately, this bacterium is killed by pasteurisation and by cooking food. Unpasteurised milk and dairy products made from unpasteurised milk may be contaminated. Certain chilled foods which are consumed without further treatment, i.e. cooking, also have a higher risk of contamination. Such foods include soft cheese (even those made with pasteurised milk), pâté, smoked salmon, deli meats, soft-serve ice-cream, luncheon meats and pre-prepared salads, e.g. coleslaw.

Toxoplasmosis

Toxoplasmosis is caused by the parasite *Toxoplasma gondii*. Humans can become infected by ingesting Toxoplasma oocystes found in cat faeces or by eating raw/undercooked meat containing visible cysts seen on infected food.

When primary infection with *Toxoplasma gondii* occurs in pregnancy, the organisms may be transmitted to the foetus and may lead to spontaneous abortion or serious handicap in the newborn.

Raw and undercooked meat, poorly cured and fermented meat products, and poorly washed salads and vegetables are possible sources of *Toxoplasma gondii*. To prevent infection, good hygiene practices are important, especially after handling raw meat or unwashed vegetables. Meat should be well cooked and served piping hot with no visible pink meat. Pregnant women should wear gloves when gardening or changing cat litter, and wash their hands afterwards.

Practical food safety and hygiene advice for pregnant women

1. Eat only freshly cooked food and well-washed freshly prepared fruit and vegetables. If eating out, it is safer to order hot dishes
2. **Avoid** the following foods:
   - Unpasteurised milk and dairy products made with unpasteurised milk. Foods include all soft cheese and mould-ripened cheese (even those made with pasteurised milk), e.g. Brie, Camembert, goats' cheese, and blue cheese, e.g. Danish Blue, Stilton, Roquefort
   - Pâté made from meat, vegetables or fish
   - Smoked salmon and gravid lax fish
3. When preparing food:
   - Wash hands before handling food
   - Wash fruits and vegetables very well before eating
   - Keep raw and cooked meats separate and wash hands and chopping boards properly after handling uncooked food
   - Use different knives, chopping boards and other kitchen utensils when preparing raw and cooked meats to avoid cross contamination
   - Cook all food thoroughly, especially meat, and serve hot
   - The fridge temperature must be below 5°C to store all food
   - Follow storage instructions carefully
   - Don't eat foods past their 'use-by' dates
4. Always wear gloves when gardening or changing cat litter, and always wash hands very well after these activities

What is the bottom line in terms of lifestyle factors which are important for a healthy pregnancy?

1. *Encourage women of childbearing age to **attain and/or maintain a healthy weight** before becoming pregnant.*

   To reduce the risk of complications during pregnancy, pregnant women should ideally be a healthy weight before becoming pregnant. Specific advice related to the amount of weight a woman should gain during pregnancy should be provided.

2. *The **additional amount of energy needed** during pregnancy is modest.*

   In the second and third trimesters, 1-2 extra healthy snacks per day are all that are needed to cover a pregnant woman's additional energy requirements. See page 14 for a list of suitable snacks.

3. ***Caffeine*** *should be limited to no more than 200mg per day.*

   Limit the number of caffeine-containing beverages consumed during pregnancy. See page 15 for the caffeine content of commonly consumed beverages and foods.

4. ***Smoking*** *is harmful to the developing foetus.*

   Smoking during pregnancy should be strongly discouraged. Pregnant women who smoke should be advised on smoking cessation and adequately supported should they choose to cease smoking. Further information: *Give your baby a breather* is available to order online at www.healthpromotion.ie.

5. ***Alcohol*** *is harmful to the developing foetus.*

   No amount of alcohol is safe during pregnancy. Women should be advised not to consume any alcohol during pregnancy.

6. ***Food safety and hygiene*** *is important to protect mother and infant during pregnancy.*

   Pregnant women should be particularly careful to follow general advice on food safety during pregnancy. Further information on food safety during pregnancy is available at www.safefood.eu.

1.4 Questions Commonly Asked by Pregnant Women

What should I do if I am pregnant and have not started taking folic acid?

If a woman is less than 12 weeks pregnant, she should **immediately** start taking 400µg of folic acid daily. She should continue to do so until she is at least 12 weeks pregnant.

If a woman is more than 12 weeks pregnant, the time in which neural tube defects could be prevented with folic acid supplementation has passed. The pregnancy should be routinely monitored with reassurance given as necessary if the pregnancy is progressing normally.

How can I reduce morning sickness?

To help alleviate morning sickness, advise the following:

1. Have **dry**, **starchy foods** such as dry crackers, toast, and cereal, regularly, to relieve nausea.
2. Have **small frequent meals and snacks** throughout the day.

Have a healthy snack (page 14) as soon as is tolerated after vomiting.

Despite nausea, it is important to encourage the pregnant woman to keep taking a daily supplement of 400µg of folic acid.

What should I do if my blood pressure is too high?

To help alleviate high blood pressure, advise the following:

1. **Be as active as possible**. The health care professional leading the care of the pregnancy should provide advice on a suitable exercise regimen.
2. **Reduce intake of salt**. Avoid high-salt foods, e.g. salty and cured meats, stock cubes, instant gravies, packet soups and ready-meals, and avoid adding salt to cooking or at the table.
3. Eat at least **5 servings of fruit and vegetables every day**.
4. Eat **3 servings of milk or milk based products every day** (page 8).

What should I do if I become constipated?

To help prevent constipation or to alleviate symptoms, advise the following:

1. Drink about **8-12 glasses (2-3 litres) of water every day**
2. With increasing fluid consumption, **increase the amount of fibre** in the diet:
   a. Include wholegrain varieties of bread, cereal, pasta and rice, as well as fresh fruit and raw or cooked vegetables, peas and beans
   b. Soak linseeds overnight and add 1-2 dessertspoons to cereal, meals, etc
3. Eat at least 5 servings of fruit and vegetables each day. Include at least 1 serving with meals and snack on fruit between meals

Take gentle exercise every day. The healthcare professional leading the care of the pregnancy should offer advice on an appropriate exercise regimen during pregnancy.

What should I do if I am not gaining enough weight during my pregnancy?

It is important to assess the woman's diet ensuring it is balanced and varied with all foods from the 5 main food groups included every day.

Advise the following:

1. Do not fast or skip meals
2. Choose foods from the 5 main food groups in line with healthy eating guidelines for adults
3. Do not exercise excessively. Speak with the healthcare professional leading the care of their pregnancy about an appropriate exercise regimen
4. Arrange a consultation with a dietitian if gaining weight remains a difficulty

What should I do if I am gaining too much weight during my pregnancy?

It is important that the diet is balanced and the woman is taking what is needed from the main food groups without too many foods which are high in fat, salt, sugar, e.g. confectionary, cakes, biscuits, crisps, and chocolate.

However, deliberate weight loss during pregnancy is not recommended.

Advise the following:

1. Have one or two fruit or low-fat dairy based snacks per day
2. Exercise according to the advice from the healthcare professional leading the care of the pregnancy
3. Avoid high-fat and high-sugar confectionery and snacks
5. Avoid fried foods

What foods should I avoid when I am pregnant?

- It is possible to get too much vitamin A from natural foods. Excessive intakes of greater than 7,000µg per day of vitamin A, well above the requirement of 700µg for pregnant women, may harm the developing foetus. As such, **food sources very high in vitamin A should be avoided during pregnancy, i.e. liver and liver products.**
- Some foods carry a greater risk of serious foodborne illnesses in high-risk groups such as pregnant women. To help prevent foodborne illness, pregnant women should follow the advice on pages 15 and 16.
- Limit tuna intake to one fresh tuna steak (150g) or two 240g cans of tuna per week to avoid excessive mercury intake.
- There is not enough evidence to say avoiding allergenic foods during pregnancy can protect an infant from developing allergies. However, if there is a strong history of nut allergy in the family, it may be advisable to avoid peanuts.

What can I do to relieve heartburn?

To help alleviate heartburn, advise the following:

1. Have **smaller and more frequent meals** in place of fewer larger meals to help avoid reflux of stomach contents
2. Avoid eating **foods which classically trigger heart burn**, e.g. fatty fried foods (slow down digestion), chocolate and caffeine (both relax the lower oesophageal sphincter)
3. **Avoid eating late at night** if heartburn occurs at bedtime
4. **Elevate the upper body** in bed (using pillows as necessary). This can help prevent regurgitation of stomach contents as can happen when lying completely flat

Are herbal teas safe during pregnancy?

Most common herbal teas, e.g. camomile, peppermint, and ginger, are safe in moderation during pregnancy. Some herbal teas may contain caffeine. The caffeine content should be checked to ensure the woman keeps her caffeine intake below 200mg per day.

Women should be advised to avoid medicinal herbs and supplements, e.g. Kava, Ginseng, Valerian Root, and Echinacea, as they are not tested for safety in pregnancy.

I'm a vegan – how can I ensure my baby gets the right nutrients to develop properly?

A vegan diet is restrictive. It may be difficult to get enough protein, iron, calcium, and vitamin B_{12} from this diet – nutrients essential for the health of both the mother and developing foetus.

To ensure the mother's diet is meeting the necessary dietary requirements, a consultation with a dietitian should be arranged.

I am concerned about my gestational diabetes and the size of my infant

Most women with gestational diabetes are able to control their blood glucose levels and avoid harm to themselves or their infant. Following diagnosis, dietary education should be provided to the pregnant women with the aim of stabilising blood glucose levels. The healthcare professional leading the care of the pregnancy should measure blood glucose levels regularly to assess the need for insulin and the size of the growing foetus should be monitored.

chapter 2

Breastfeeding – the Best Way of Feeding your Infant

2.1 Breastfeeding

Breastfeeding supports optimum growth, development and health, and also ensures better future health for infants and their mothers. The milk a mother produces in the days following birth is called colostrum. Colostrum contains extra antibodies which help an infant fight infection and disease. Even if a mother chooses not to breastfeed long-term, mothers should be encouraged to breastfeed in the days immediately following birth, so that this immunity is passed onto the infant.

Each infant has slightly different needs and each mother's breast milk is unique in order to meet the specific needs of her infant. Breast milk changes over time in order to meet changing nutritional requirements as the infant grows and develops.

This quality of breast milk ensures that it provides complete nutrition for the infant for about the first 6 months of life.

Department of Health and Children – Breastfeeding Recommendations

The Department of Health and Children recommends that:

- For the first 6 months, infants should be exclusively breastfed
- From 6 months to 2 years and beyond, breastfeeding should continue whilst giving the infant suitable solid foods from a spoon

This recommendation is suitable for most infants. However, every infant is different, so parents/carers should be guided by the readiness of the infant. Some infants may benefit from a slightly earlier introduction of solid foods. Despite this, **no healthy infant needs solid food before 4 months (17 weeks) of age**, and so should not be given any solid food before this time.

The long and short-term benefits of breastfeeding for mother and infant

Breastfeeding offers many advantages for both the mother and her infant (**Table 10**). Breastfeeding helps to keep them both healthy in both the short-term and throughout later life.

Table 10. Long and Short-Term Benefits of Breastfeeding for Mother and Infant

Breastfeeding protects the health of the MOTHER	Breastfeeding protects the health of the INFANT
Short-Term Health Advantages	**Short-Term Health Advantages**
• Decreased post-partum bleeding and more rapid uterine involution • Promotes a sense of relaxation and well-being • Helps nurture the bond between mother and infant • Aids weight loss after the birth of the infant • Helps save time and money. Breast milk is available on demand and at the right temperature, and no preparation or equipment are required	• Decreased risk of infection resulting in fewer hospital visits during the first 12 months of life • Helps protect against ear infection • Helps to reduce the risk of gastroenteritis • Decreased risk of Necrotising Enterocolitis (NEC) • May reduce the risk of Sudden Infant Death Syndrome (SIDS) • Breastfeeding precludes any of the risks associated with formula milk, e.g. bacterial contamination and over or under concentration of milk feeds
Long-Term Health Advantages	**Long-Term Health Advantages**
• May be protective against breast cancer • May reduce the risk of ovarian cancer • May reduce the risk of developing rheumatoid arthritis in later life	• May reduce the risk of Coeliac disease and Crohn's disease • May reduce the risk of overweight and obesity • Associated with a reduced risk of high blood pressure and high cholesterol • May be linked with a reduced risk of developing diabetes in later life • May reduce the risk of asthma and allergy

Breastfeeding and contraception

Breastfeeding has some contraceptive effect, but is not always a reliable form of contraception. Breastfeeding is only considered a reliable form of contraception (98% efficacy) if:

1. The mother is breastfeeding regularly, with no more than 4 hours between feeds during the day, and a maximum interval of 6 hours between feeds at night
2. Breastfeeding is exclusively providing 90-95% of the infant's dietary requirements

Women who are not breastfeeding as described above, who are not planning another child immediately or whose menses have returned, should use an alternative form of contraception compatible with the continuation of breastfeeding. Non-hormonal methods of contraception, e.g. barrier methods, the copper intrauterine device, or the progesterone-only contraceptive pill are preferred options, as these do not interfere with breastfeeding.

Situations in which breastfeeding is not advisable

There are very few medical reasons why a mother would not be able to breastfeed or an infant cannot receive breast milk (Table 11). If a mother needs a particular medicine that is not suitable while breastfeeding, a safe alternative can usually be found. The Health Service Executive (HSE) has produced a factsheet on medicines unsuitable for breastfeeding women entitled *Prescribing for breastfeeding mothers*. This is available in Appendix 1 and on www.breastfeeding.ie

The different types of breastfeeding

Exclusive breastfeeding

An infant receives only breast milk (including breast milk which has been expressed from the mother or a wet nurse) and no other liquids or solids. The only exception is oral rehydration salt solution, drops or syrups consisting of vitamin or mineral supplements or medications.

Predominant breastfeeding

An infant receives breast milk (including breast milk which has been expressed from the mother or a wet nurse) as the main source of nourishment. However, an infant may receive cooled boiled water and water-based drinks.

Partial breastfeeding

An infant receives breast milk in combination with infant formula, other fluids and/or solid foods.

Any breastfeeding

An infant receives any breast milk or combination of breast milk and formula and/or solid food.

Table 11. Situations in Which Breastfeeding is Not Advisable

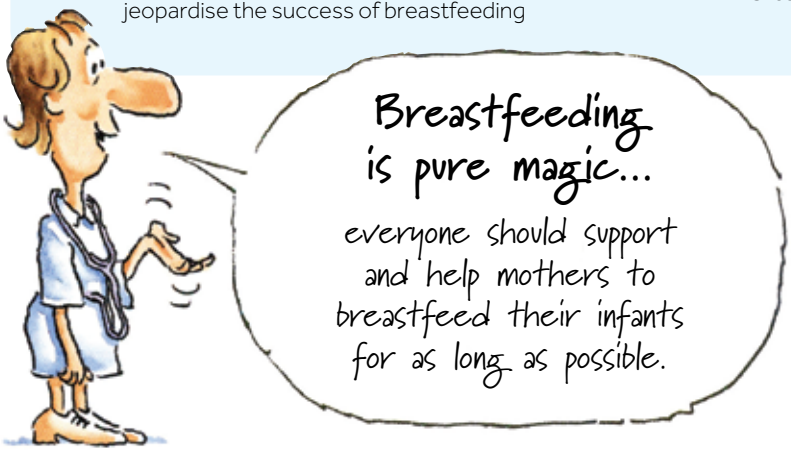
Contraindications for mother to breastfeed	Contraindications for an infant to be breastfed
Human Immunodeficiency Virus (HIV)	If the infant has galactosaemia
Untreated Tuberculosis (TB)	If the infant has a particular metabolic disorder, e.g. phenylketonuria (PKU)*
T-cell lymphotrophic virus type I or II	For further information, see factsheet *Contraindications to Breastfeeding* on www.breastfeeding.ie
Herpes simplex lesion on breast	
Immune system is compromised	
If taking cytotoxic drugs	
Undergoing radiation therapy	

* Some breastfeeding is possible and can benefit both mother and infant. However, the amount of breast milk given should be carefully monitored by the metabolic team.

Checklist for healthcare professionals regarding what mothers should know about breastfeeding

Breastfeeding must be learned. Ensure that women who have given birth know the following:

- How to **correctly position and attach** an infant at the breast
- **Infant-led or demand feeding is normal** and ensures a good milk supply
- Reassure the mother that it is **normal for infants to feed frequently**, especially in the early weeks both because of their small stomachs and the quick and easy digestion of breast milk
- If **feeding well**, an infant will suckle deeply; mothers will hear some swallowing and the feeding will not be painful. An infant should seem satisfied and/or sleep until the next feed
- If there is a doubt about **milk adequacy**, the feeding technique should be checked and corrected first
- The composition of breast milk changes during a feed. As such, it is important that an infant is allowed to **feed from each breast until they are both nearly empty**
- Infants may want to be put to the breast for reasons other than hunger. It is OK to offer these '**comfort feedings**' as another way of meeting an infant's needs
- It is important that mothers believe in the effectiveness of breastfeeding and should **avoid giving an infant any other drinks**. Offering an infant other drinks/fluids will interfere with the demand-supply basis of milk production and may jeopardise the success of breastfeeding
- Infants go through **growth spurts** roughly every 3 weeks. During these times, an infant may demand more feeds. Growth spurts last approximately 48 hours after which the feeding routine returns to a pattern that is more typical for the infant. Feeding more during a growth spurt is normal
- Once breastfeeding is established, **wet nappies should increase** to about 6 or more every day. Stools should turn from a green to a mustard-yellow colour. Infants will have about 4 soft bowel motions in a 24 hour period, but can have more or less than this.
- Breast milk can be expressed and stored in the refrigerator or frozen (page 29). This allows the mother to ensure breast milk is given to her infant even if they are apart, e.g. if she goes back to work. This also means that other people can feed the infant
- Breastfeeding mothers need support and should be reassured that they are not alone. Mothers should be encouraged to ask for support from healthcare professionals, family members and friends who are knowledgeable about breastfeeding. Family and friends can also provide invaluable support by helping to mind the infant, cleaning, cooking etc
- Other family members should be informed about how important breastfeeding is for the mother and her infant and should give advice on practical things they can do to offer support and reassurance to the breastfeeding mother (for further information on support available for breastfeeding mothers, see page 23)



How does a mother know when her infant wants to breastfeed?

1. Healthy infants will let parents/carers know when they are hungry by the following early signs or cues:
   - Putting hands towards mouth
   - Making sucking motions
   - Whimpering or lip smacking
   - Stretching or yawning
   - Waking and looking alert
   - Becoming more active
   - Nuzzling against the breast, or 'rooting'
   - Raising arms or pulling legs towards their middle
   - Crying is a late feeding cue
2. If an infant sleeps for stretches longer than 4 hours in the first 2 weeks, they should be woken for feeding.
3. If an infant will not wake enough to feed at least 8 times per day, advice from a GP, public health nurse (PHN), lactation consultant or paediatrician should be sought.
4. A newborn infant can feed every 1 ½ to 3 hours around the clock. Therefore, an infant should feed 8-12 or more times per day. **However, every infant is different. A mother will soon get to know her own infant's feeding patterns.**

Educating and supporting women who choose to breastfeed

It is essential that a mother who chooses to breastfeed is shown the correct way to breastfeed. This helps the mother to feel more confident when feeding her infant, making the experience more positive. It also helps ensure that breastfeeding meets the nutritional needs of an infant.

The process of educating and supporting women with respect to breastfeeding should start in the antenatal period. Education and support for women who choose to breastfeed should continue from the maternity unit to community care.

Individuals and groups who can support breastfeeding women:

1. **Healthcare professionals in the community:** PHNs, practice nurses and GPs
2. **Lactation consultant:** The lactation consultant(s) in the hospital where the infant was born or private lactation consultants. Details available at www.alcireland.ie
3. **Community support groups:** La Leche League (www.lalecheleagueireland.com) and Cuidiú (www.cuidiu-ict.ie)

Antenatal Care

All healthcare professionals in contact with expectant mothers should provide information on the benefits of breastfeeding and offer practical advice on preparing to breastfeed. Planning ahead is important as new mothers will be busy once the infant arrives. Advice should encompass maintenance of breastfeeding if mothers are away from the infant or have returned to work, and how to arrange time to breastfeed when they are back in work with their employer. Mothers should be advised to link in with local breastfeeding support groups.

Maternity Unit

Healthcare professionals in the maternity unit should:

1. **Help mothers to initiate breastfeeding within half an hour of the birth of the infant**
2. **Show mothers how to breastfeed and how to maintain lactation even if they are away from their infant**
3. **Assess breastfeeding during the hospital stay and just before the mother goes home**
4. **Provide a breastfeeding checklist to help mothers know if breastfeeding is going well (page 24)**
5. **Provide information on breastfeeding support groups close to the mother's home**
6. **Provide the mother with the contact details of appropriate professionals who can answer any questions or problems a mother may have**

If the mother is transferred home under the early transfer home team, midwives in the hospital should assess the mother's breastfeeding technique and the infant's growth. The PHN should check on breastfeeding and the infant's height and weight from then on.

Community Care

Mothers will be contacted by their public health nurse less than 48 hours after discharge from hospital. When the baby is 3-5 days old, an office or home visit will be arranged to check on breastfeeding and the infant's weight.

Healthcare professionals in the community should help identify potential barriers to breastfeeding and should help mothers overcome any issues so they may breastfeed for as long as possible.

A checklist to help mothers know if breastfeeding is going well

Mothers should remember that it takes time to feel confident about breastfeeding and should not panic if everything is not perfect at the beginning.

If the answer to all questions is YES when an infant is 1 week old, breastfeeding is likely to be going well.

If the answer to any question is NO, further help should be sought to prevent problems and promote a good breastfeeding experience.

	YES	NO
Do you feel breastfeeding is going well for you so far?	○	○
Has your milk come in yet, i.e. did your breasts get firm and full between the 2nd and 4th day after having your infant?	○	○
Is your infant having at least 4 good size dirty nappies, i.e. more than a stain on the nappy, daily?	○	○
Is your infant wetting his/her nappy at least 6 times each day?	○	○
Are your breasts free from any sore, tender, or red and firm areas?	○	○
If you had nipple soreness at the beginning, has this now stopped?	○	○
Do your breasts feel full before feeding and softer after feeding?	○	○
Does your infant feed every 2-3 hours with no more than one interval of up to 5 hours at night, i.e. at least 8 breastfeeds every 24 hours?	○	○
Is your infant feeding at least 8 times in 24 hours? (Tick NO if your infant is sleepy and needs to be woken up for most feeds)	○	○
Do you see and hear swallowing when your infant is breastfeeding, and is your infant's suck strong, slow and steady?	○	○
Is your infant able to sustain rhythmic sucking for at least 10 minutes altogether at each feed?	○	○
Does your infant seem satisfied after a feed (happy or sleepy), and does your infant come off the breast looking relaxed and content?	○	○
Is your infant sleeping between feeds?	○	○
Are your infant's eyes bright and alert and their mouth moist?	○	○
Does your infant have a strong cry and move actively?	○	○

Other fluids during an infant's first year of life

What other fluids should be given in the first year of an infant's life?

Breast milk should be used as the main milk drink for the first year of life. If breast milk is not available, standard infant formula should be used.

Up to about 6 months of age, infants generally do not need other drinks in addition to their milk feeds. However, cooled boiled water can be offered to formula fed infants. If the tap water is not suitable to drink, cooled boiled bottled water (containing less than 20mg of sodium per litre) is a suitable alternative. Up until the age of 12 months all water offered to an infant should be cooled boiled water.

See **Table 12** (page 41) for a guide to the average daily volume of fluid infants should consume during the first year of life.

Unsuitable fluids

Tea, coffee, fizzy drinks, drinks with artificial sweeteners, juices and juice drinks are all unsuitable fluids for infants. These drinks can damage an infant's teeth and reduce their appetite for milk and spoon feeds.

If parents/carers choose to offer juices, only small amounts of well-diluted, unsweetened fruit juice (dilute 1 measure of pure juice to 8-10 measures of cooled boiled water) should be given from a beaker at mealtimes or with snacks from 6 months onwards.

Cows' milk should not be offered as the main milk drink until an infant is 12 months old (corrected age of 12 months old for a pre-term infant). However, small amounts of pasteurised full fat cows' milk can be used in the preparation of weaning foods from 6 months of age.

Introducing a cup or beaker

Introducing a cup or beaker is a gradual process that can start from about 6 months of age onwards. An infant will need help with this initially and some mess is to be expected. To begin this process, fluids other than breastfeeds can be offered from a lidded beaker with a non-valved, free-flowing spout. The aim should be that by 12 months of age all bottles will be discontinued and a **non lidded beaker** will be used for all fluids other than breastfeeds.

DID YOU KNOW?

Using a bottle for too long can cause problems with dental health and can lead to feeding problems later.

Vitamin D supplementation for infants

Vitamin D is a fat soluble vitamin and is essential for good bone health because it helps our body absorb calcium. In addition, some research has linked low levels of vitamin D with heart disease, diabetes and the metabolic syndrome.

Vitamin D can be made in the skin when the skin is exposed to ultraviolet (UV) light from the sun's rays. However, direct exposure to sunlight is not recommended for infants and young children because of the risk of skin cancer.

Between 0-12 months, infants grow very quickly and sufficient vitamin D is required to form strong bones. An infant's diet, whether breastfed, formula fed or taking solid foods (or a combination of these), does not commonly include sufficient vitamin D.

... Therefore

all infants, including breastfed infants, should receive **5µg (200 IU) of vitamin D_3 as a supplement daily** throughout the first year of life.

- Parents/carers should be advised to consult their pharmacist for advice on the most suitable vitamin D_3 supplement for their infant. The product should contain vitamin D_3 only and be in a liquid form suitable for infants.
- Instructions must be read carefully to ensure that the correct vitamin dose is provided each day as the number of drops or amount of liquid required to provide the recommended 5µg (200 IU) daily is different for each product.

WARNING!

Very high amounts of vitamin D are harmful. The recommended 5µg (200 IU) of vitamin D per day is very safe for infants.

If the vitamin D_3 supplement is given in the correct amount according to the manufacturer's instructions and product information, there is no risk of overdose. Giving the correct amount is very important. If parents/carers forget to give their infant their daily vitamin D_3 supplement, they should start again the next day – only one dose per day should be given.

Colic – a condition experienced during the milk feeding phase

What is colic?

Colic is a condition that affects both breastfed and formula fed infants equally. Colic is characterised by excessive crying in otherwise healthy infants that lasts at least 3 hours a day, on at least 3 days per week for at least 3 weeks.

What causes colic?

The exact cause of colic is unknown but colic is not harmful or dangerous to the infant. The infant will continue to feed and gain weight normally.

However, if colic is suspected, GPs should perform a physical examination to ensure there is no other underlying reason for the excessive crying.

What is the treatment?

There is no cure for colic but symptoms of colic resolve spontaneously in the vast majority of infants by 4 to 5 months of age. As colic always resolves on its own, medical treatment is not usually necessary. Breastfeeding mothers should not be advised to cease breastfeeding. For infants who are not breastfed, parents/carers should be encouraged to seek the advice of a healthcare professional regarding the use of specialised formula milks.

There is no best way to comfort an infant with colic but the following suggestions may be useful for parents/carers:

- Check the infant is not hungry or thirsty
- Hold the infant during a crying episode – this can sometimes help
- Prevent the infant from swallowing air by sitting them upright during feeding
- If breastfeeding, advise the mother to avoid drinking too much tea, coffee, and other drinks that contain caffeine. See Table 9 (page 15) for the caffeine content of commonly consumed beverages and foods
- Burp the infant after a feed as necessary
- Some evidence suggests that 'over-stimulating' an infant by continually picking them up and putting them down may aggravate the crying
- Infants like movement, so pushing them around in their pram or pushchair, or going for a drive, can be comforting
- Background noise such as the sound of a washing machine or vacuum cleaner may be soothing for an infant
- Gentle stomach, or back rubs, or a warm bath, may also help to relieve colic

Those most affected by colic are often the parents/carers. Inability to console a new infant is a significant source of stress. Healthcare professionals must offer support, reassurance and empathy to the parent/carer.

What is the bottom line in terms of breastfeeding?

1. *Breastfeeding is the* ***biologically normal and best way*** *of feeding infants.*

   The vast majority of mothers can breastfeed and the breast milk produced will provide their infants with complete nutrition for about the first six months of life.

2. ***Any amount*** *of breastfeeding is beneficial for infants.*

   Even if a mother chooses not to breastfeed long-term, mothers should be encouraged to breastfeed in the days immediately following birth, so that the immunity in the first milk (colostrum) is passed onto the infant.

3. *The experience of breastfeeding has often been lost and* ***needs to be re-learned****.*

   Healthcare professionals need to provide women with reassuring and practical information on how to breastfeed and on how to know that breastfeeding is going well.

4. *Mothers should be* ***aware of the services available*** *to help them to breastfeed.*

   Community support programmes, PHNs, GPs and public and private lactation consultants can assist breastfeeding mothers. Mothers can also be encouraged to log on to the HSE breastfeeding website www.breastfeeding.ie which offers useful information for breastfeeding mothers. For further information on support available for breastfeeding mothers see page 23.

5. *A* ***feeding assessment should be carried out*** *at the commencement of breastfeeding.*

   A feeding assessment should be carried out by a lactation consultant or experienced midwife before the mother leaves the maternity unit and during the first few days following discharge. This is essential to reassure the mother and to ensure that any issues are addressed early to promote a positive breastfeeding experience.

6. *All infants should receive* ***5µg (200 IU) of vitamin D$_3$*** *as a supplement daily.*

   Between 0-12 months, infants grow very quickly and sufficient vitamin D is required to form strong bones. An infant's diet, whether breastfed, formula fed or taking solid foods (or a combination of these), does not commonly include sufficient vitamin D, therefore daily supplementation is required.

Further information

- Helpful, reliable advice on all aspects of breastfeeding can be found at www.breastfeeding.ie
- HSE 2009, *Breastfeeding your baby* – www.healthpromotion.ie
- HSE 2003, *Feeding your baby* – www.healthpromotion.ie
- HSE 2010, *Vitamin D and your baby* – www.healthpromotion.ie

2.2 Expressing Breast Milk

Expressed breast milk can be a critical part of caring for newborn infants. For example, if a mother has given birth prematurely, the infant may not be able to take milk directly from the breast but can be given expressed breast milk. Expressed breast milk also allows a mother to continue to feed her infant breast milk when she is away from her infant, e.g. outings, back at work, etc.

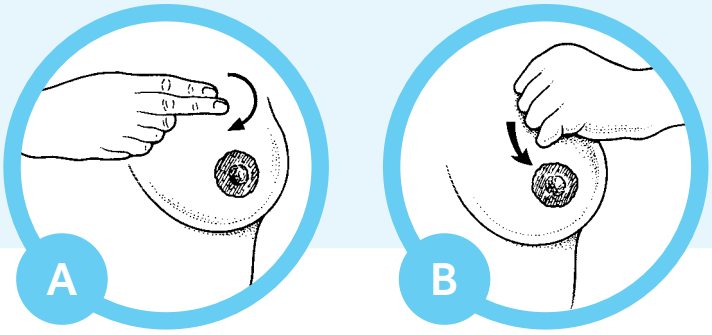
Preparing to express breast milk

The HSE has developed helpful guidelines for mothers who wish to express breast milk.

Guidelines for Preparing to Express Breast Milk

Before starting to express

1. Wash and clean your hands
2. To encourage milk to flow when you do express, try the following:
   a. Make yourself comfortable. It can help to sit in a quiet room with a warm drink and some relaxing music
   b. Have the infant close by or, if this is not possible, have a photograph of the infant
   c. Have a warm bath or shower before expressing, or if this is not possible, apply warm flannels to your breasts. This is especially useful when learning to express
   d. Gently massage the breast. This can be done with finger tips (**Picture A**) or by rolling a closed fist over the breast towards the nipple (**Picture B**). Work around the whole breast, including the underneath. Do not slide your fingers along the breast as this can damage the delicate breast tissue
   e. Gently roll the nipple between the first finger and thumb. This encourages the release of hormones which stimulate the breast to produce and release milk
   f. As you get more practice, you may find that you do not need to prepare so carefully
3. Breast milk can be expressed in 3 ways:
   a. By hand
   b. With a hand pump
   c. With an electric pump
4. Milk will start to flow 1-2 minutes after you begin to express. Try to express from one breast until the flow of milk slows or stops, and then move to the other breast. This should be repeated until you can no longer get milk from either breast.



Different methods of expressing breast milk

Expressing breast milk by hand

This is a free and convenient way of expressing milk and is particularly useful if you need to relieve an uncomfortably full breast. These instructions are a guide but remember that with practice you will find what works best for you.

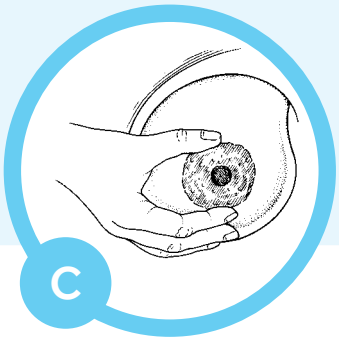
Technique for hand expressing

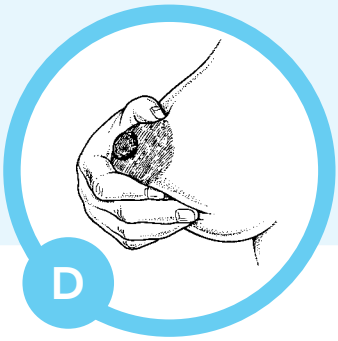
Each breast is divided into roughly 15 sections, each with its own milk ducts. It is from these ducts that the milk is expressed. To ensure that milk is expressed from all sections of the breast, it is important that fingers are rotated all around the breast.

1. Place the index finger under the breast, at the outer edge of the areola (dark area around the nipple), and the thumb on top of the breast opposite the index finger (**Picture C**). If you have a large areola, you may need to place your index finger and thumb slightly nearer the nipple (if the areola is small, you may need to move your fingers further back, beyond the areola). Your other fingers should support your breast.
2. Keeping fingers and thumb in the position outlined and gently press backwards towards your chest wall (**Picture D**).
3. Maintaining this gentle backwards pressure, press the thumb and first finger together to push the milk along the ducts and toward the nipple.
4. Release the pressure to allow the ducts to refill and then repeat steps 2 and 3.
5. It is possible to express from both breasts simultaneously, and with practice this can be done to help save time.

Things to remember when expressing breast milk by hand

1. Do not squeeze the nipple; this is not effective and can be painful.
2. Do not slide your fingers along the breast as this can damage the delicate breast tissue.
3. As you continue to practise, steps two to four above should take no longer than a few seconds. You will be able to build up a steady rhythm which results in the milk dripping or spurting from the breast.
4. Collect the expressed breast milk in a sterile container made of glass or hard plastic.
5. **Plastic bags are not recommended for storing breast milk** as there is a risk of spillage, leakage and contamination of the milk.





Expressing breast milk with a hand pump

There are a number of different designs, all of which work in slightly different ways. Some are operated by hand and some by battery. They all have a funnel that fits over the nipple and areola.

Different pumps suit different women – it is therefore best, if at all possible, to try out a pump before buying.

Expressing breast milk with an electric pump

Electric pumps are fast and easy to use because they work automatically. They are particularly good if a mother needs to express for a long period, e.g. if her infant is in the Special Care Unit. If this is the case, then she should try to express a minimum of 6-8 times in 24 hours, including once during the night, to maintain supply.

It is possible to express from both breasts at the same time using some electric pumps that have a dual pumping set. This is quicker than other methods and may help the mother to produce more milk.

Storing expressed breast milk

Breast milk can be successfully stored. Breast milk must be stored in the right way to ensure that it is fresh for the infant when it is needed. Breast milk should be stored in small amounts (just enough for one feed) to reduce waste. **Bottles, teats, and any other equipment used to store and feed expressed breast milk must be sterilised before use**. The HSE has developed guidelines for storing expressed breast milk. The guidelines outlined below help to ensure that milk is as fresh as possible for an infant.

When filling containers to store expressed breast milk, remember:

1. Keep milk expressed on different days separate
2. Several breast milk yields expressed on the same day can be combined so that the desired volume can be stored. If adding breast milk yields expressed on the same day together, chill the breast milk yields separately in the fridge for 1 hour before combining
3. **When storing breast milk, only combine breast milk yields expressed on the same day. However, if there is a supply of frozen colostrum, or breast milk expressed in the first 2 weeks of breastfeeding, it can be combined with fresh breast milk to ensure the baby receives the benefit of both**
4. Breast milk expands during freezing – do not completely fill storage containers to allow room for expansion
5. Label all milk containers using a water-proof marker with the day, date and if necessary, with the infant's name. Always use the oldest milk first if storing breast milk

Fresh breast milk is better than stored breast milk with the exception of stored colostrum and stored early milk (milk from the first 2 weeks of breastfeeding).

If a mother is leaving her infant with a child care provider she should make sure they know how to store expressed breast milk correctly and how to thaw (if necessary) and warm expressed breast milk.

On the label, the following should be clearly written:

1. Child's name
2. Contents of the bottle, i.e. breast milk
3. Date the breast milk was expressed

Storing expressed breast milk for use at home

1. Freshly expressed breast milk		
Storage location	**Storage time**	**Storage advice**
Room temperature (26°C or below)	6 hours	• Refrigerate where possible.
Refrigerator (4°C or below)	5 days	• Store at the back of the main body of the refrigerator where the temperature is coldest. • Do not store in the door of the refrigerator as the temperature is most variable here.
Freezer (-18°C or below) **compartment of the fridge**	2 weeks	
Freezer (-18°C or below) **section of a fridge with separate main door**	3 months	
Separate chest freezer (-18°C or below)	6 months	

2. Previously frozen breast milk, thawed in refrigerator and not warmed		
Storage location	**Storage time**	**Storage advice**
Room temperature (26°C or below)	Up to 4 hours	• Refrigerate where possible.
Refrigerator (4°C or below)	Up to 24 hours	• Store at the back of the main body of the refrigerator where the temperature is coldest. • Do not store in the door of the refrigerator as the temperature is most variable here.
Freezer (-18°C or below)	Never refreeze	

3. Breast milk thawed outside the refrigerator in warm water		
Storage location	**Storage time**	**Storage advice**
Room temperature (26°C or below)	About 1 hour	• Refrigerate where possible.
Refrigerator (4°C or below)	Up to 4 hours	• Store at the back of the main body of the refrigerator where the temperature is coldest. • Do not store in the door of the refrigerator as the temperature is most variable here.
Freezer (-18°C or below)	Never refreeze	

4. Infant has begun feeding	
Storage location	**Storage time**
Room temperature (26°C or below)	Duration of the feed
Refrigerator (4°C or below)	**Do not store**, remaining milk must be discarded after feeding
Freezer (-18°C or below)	**Do not store**, remaining milk must be discarded after feeding

Preparing to feed stored expressed breast milk to an infant

1. **Fresh breast milk should be used before stores of refrigerated or frozen breast milks.**
2. If no fresh milk is available, stored colostrum or the oldest refrigerated breast milk should be used before thawing and using frozen breast milk.
3. Ideally, frozen breast milk should be thawed in the fridge for up to 24 hours before it is used. Breast milk can also be thawed in a bowl of warm water. The warm water should never reach the neck of the container the breast milk is stored in.
4. Expressed breast milk can be fed at room temperature or warmed before giving it to an infant.
5. To warm breast milk, **place the milk in a bowl of hot water** and wait for the milk to heat up. The water must not reach the neck of the bottle. Swirl the milk to distribute the heat evenly.

6. **DO NOT MICROWAVE BREAST MILK**. Heating milk in a microwave causes heat spots in the milk which can scald an infant's mouth, and high temperatures can destroy important nutrients in the milk.
7. **AVOID SCALDING**: Always test the temperature of the milk before offering it to an infant. Make sure the milk is not too hot by shaking the bottle and **placing a drop of liquid on the inside of the adult's wrist. Milk should feel lukewarm.**

Feeding expressed breast milk to an infant

1. Remember that feeding is a time for an infant and caregiver to enjoy. It helps to:
   a. Have everything needed for feeding close by
   b. Sit down, relax and be comfortable
   c. Avoid slouching when holding the infant
   d. Make sure the infant is held close and is well-supported and comfortable
   e. Choose a position that encourages eye contact
   f. Hold the infant so that their back is straight and their head is higher than the rest of their body
   g. Alternate the side on which the infant is fed. If the infant is held in the right arm at one feed, hold them in the left arm at the next feed. This helps the infant's muscles to develop equally on both sides
2. Shake the bottle well and allow any air bubbles to settle before feeding.
3. Check that the milk is at a suitable temperature, i.e. lukewarm.
4. Allow enough time for feeds. Actual feeding time is generally about 20 to 30 minutes but extra time may be needed to thaw or warm the milk.
5. Never leave an infant alone with a bottle or prop the bottle up. Do not leave an infant with a bottle in bed. Feed the infant and then take the bottle away.
6. Throw away any breast milk that is not used within 6 hours. Never re-use or re-warm expressed breast milk.
7. If possible, wash the used bottle or cup immediately after use or rinse it in warm water. All bottles and cups must be properly washed and sterilised before re-use (see page 37).

What is the bottom line in terms of expressing breast milk?

1. *Expressing breast milk takes **practice**.*

   Mothers should try to be patient when starting to express breast milk – it gets easier with time and practice.
2. *Any **equipment** needed for collecting, storing or feeding breast milk should be sterilised.*

   Bottles, teats, and any other equipment used to store and feed expressed breast milk must be sterilised before use.
3. ***Storage guidelines** for expressed breast milk should be strictly adhered to.*

   Breast milk should be stored in volumes used for feeding. Guidelines for **storage location, temperature and time** should be carefully followed (see page 30).
4. *Guidelines for **using expressed breast milk** should be strictly adhered to.*

   Fresh breast milk should be used before stores of refrigerated or frozen breast milks unless it is frozen early milk. **Never microwave** breast milk. Always **check the temperature** of breast milk before feeding.

2.3 Breastfeeding and Returning To Work

Many women stop breastfeeding when they return to work. However, with support at work, women can continue breastfeeding, ideally in line with best practice recommendations from the Department of Health (page 19).

Facilitating the continuation of breastfeeding benefits the employer

Breastfed infants are, in general, less frequently ill when compared to formula fed infants. This can positively affect productivity due to fewer days being taken to care for sick infants. Women are also more likely to return to work and do so sooner if continued breastfeeding is facilitated. This results in a lower staff turnover and a reduction in training costs. Companies which facilitate breastfeeding also have a more positive corporate image and family-friendly approaches can increase loyalty among staff and customers.

Breastfeeding at Work – Information for Employers and Mothers

The Health Promotion Unit of the HSE has produced a booklet entitled Breastfeeding and Work (2005). See www.healthpromotion.ie to order or download the booklet.

Under the Maternity Protection Act (Protection of Mothers who are Breastfeeding) Regulations, 2004 (S.I. No. 654 of 2004), breastfeeding mothers are entitled to take one hour off each day as a breastfeeding break without any loss of pay. All women who have an infant less than 26 weeks of age are entitled to this. Women who wish to avail of this must inform their employer at least 4 weeks before returning to work so that all the necessary arrangements can be made.

This time can be taken in any of the following ways, at any stage during the day:

- 1 x 60 minute breastfeeding break
- 2 x 30 minute breastfeeding breaks
- 3 x 20 minute breastfeeding breaks
- Other time periods, as agreed with the employer

Employers should be encouraged to develop a breastfeeding policy. Employers should provide a warm, ventilated, lockable room separate from the toilet. This can be a double purpose room such as a first aid room. The room should have:

- Comfortable chairs, a changing mat, an electric socket, access to a fridge, a clean table or work surface and a lockable cupboard
- A hand basin or sink (these could also be available in a nearby room)

2.4 A Mother's Diet and Lifestyle during Breastfeeding

Women do not need a special diet to be able to breastfeed successfully. Women who are breastfeeding should be encouraged to **follow the healthy eating guidelines for women in Ireland** (see page 4).

Breastfeeding women should particularly remember to:

1. Include 1-2 portions of oily fish in their weekly diet (see pages 11). These are good for the heart health of the mother, and also play a role in brain and eye development of an infant
2. Consume vitamin D rich foods and/or take a low dose Vitamin D supplement (see page 5)
3. Consume at least 3 portions of milk and milk-based dairy products every day (see page 8). However, for women who are vegan, lactose intolerant, or who find it difficult to consume enough calcium rich foods in their daily diet, a calcium supplement may be needed (see page 9)
4. Drink plenty of fluids while breastfeeding – at least 2 litres (8 glasses) every day

Caffeine and breastfeeding

Small amounts of caffeine can be passed to an infant through breast milk, possibly causing poor sleep and irritability in the infant. Women who breastfeed should limit their caffeine intake to 2-3 cups of caffeinated drinks each day. Caffeine-free herbal teas may be a suitable alternative whilst breastfeeding.

Alcohol and breastfeeding

Small amounts of alcohol can be passed to an infant in breast milk, possibly causing poor sleep in the infant. Breastfeeding women should follow the guidelines for the recommended maximum daily alcohol intake for women.

If a woman knows she will be drinking alcohol, she should try to express breast milk before drinking. **If a woman has consumed alcohol less than 2-3 hours before the infant is to be fed, she should express and discard breast milk that may be tainted with alcohol before feeding the infant.**

Smoking and breastfeeding

Infants must be protected against passive smoking. Smoking decreases milk production and can increase the risk of Sudden Infant Death Syndrome (SIDS).

Chemicals from cigarettes can be passed to an infant through breast milk so women should try to avoid smoking while they are breastfeeding and should never smoke in the house or expose an infant to smoke.

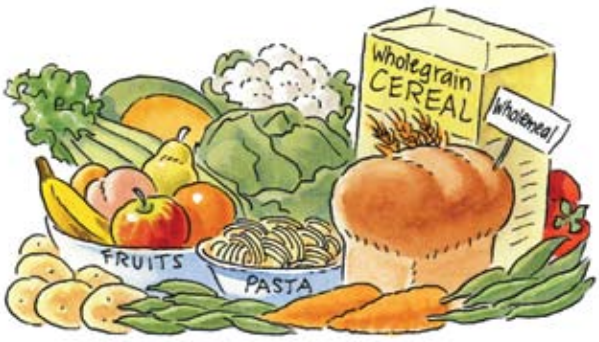
Further information

- *Give your baby a breather* – www.healthpromotion.ie

Weekly alcohol limits for men and women have been lowered.

Women should not consume more than 11 units of alcohol spread over a week.

A unit is a rough measure of the amount of drink that will provide about 10g alcohol, e.g. ½ pint beer (284ml), pub measure of spirits (35.5ml), or a small glass of wine (100ml).



chapter 3
Formula Feeding

3.1 Formula Feeding

Although rare, there are certain situations in which breastfeeding is contraindicated (page 21). In such cases, or if parents/carers make an informed choice not to breastfeed their infant, a suitable infant formula is needed to provide the infant with the nutrition they need to grow and develop.

Manufacturers endeavour to make the composition of infant formula milk as similar as possible to that of breast milk. Despite this, formula milks do not contain certain health promoting components which breast milk naturally contains.

Powdered infant formula may contain harmful bacteria such as *Cronobacter* species (formerly *Enterobacter sakazakii*) and *Salmonella*. In order to ensure that these harmful bacteria are killed, guidelines detailing how to prepare powdered infant formula safely must be followed.

What factors must be considered when parents/carers choose to formula feed their infant?

Parents/carers should be aware of all the steps involved in safely preparing formula milk. Each of the factors listed below are discussed in detail over the following pages.

a. Choosing the right milk

There are lots of different types of milk suitable for infants available on the Irish market. If an infant is not being breastfed, a standard first infant formula should be used throughout the first year of life.

b. Having all the right equipment

Equipment needed to prepare bottles includes a steriliser, bottles, teats, collars, discs, caps and tongs. A suitable area to wash, sterilise and store the bottles is needed.

c. Washing the equipment

Washing helps to remove old milk and also some of the bacteria that may grow in the milk and on the bottles. Washing is very important because infants can become sick from these bacteria.

d. Sterilising the equipment

Washing is not enough. Infants are so vulnerable to illness that it is necessary to sterilise all equipment used for feeding. Steam is best but boiling or sterilisation tablets/liquids are also acceptable.

e. Using the right water to make up the feed

The water used to make feeds must be hot enough to kill bacteria in the water and in the powdered infant formula. Drinking water from the cold tap which has been boiled once and cooled for 30 minutes should be used.

f. Preparing the feed

Use sterile equipment and do not touch the bottles with hands. Use the right water (see 'e' above for description) which should be hot enough to kill harmful bacteria but not so hot that it destroys any important nutrients in the milk.

g. Storing and transporting feeds

Milk feeds must be stored and transported at the right temperature to prevent the growth of harmful bacteria which may cause illness.

h. Feeding time

Every infant is different. Different infants will take different amounts of milk and have their own feeding routines. Parents/carers should know how to avoid scalds, how to keep milk as fresh, and how to position the infant during feeding to avoid the infant swallowing too much air.

a. Choosing the right infant formula

Standard infant formula milks

This is infant formula milk labelled 'from birth' or 'newborn.' This milk is whey-based and is the type of infant formula most commonly recommended for infants who are not breastfed. If an infant is not being breastfed, **standard infant formula is suitable for infants from birth to 12 months of age**.

Formula milk labelled 'for hungrier babies' or 'extra hungry'

These milks are casein-based infant formulas marketed for 'hungrier babies'. They have more casein protein than standard infant formula milks. Casein protein is more difficult for an infant to digest, so it is thought that casein in formula milk may give an infant a feeling of fullness for longer. However, there is not enough scientific evidence to suggest or confirm this. This type of formula does not have any extra calories or nutrients compared to standard infant formula milks.

Specialised formula milks for infants with a specific medical condition

Note: The use of specialised formula milks should be based on the advice of a healthcare professional.

- **Lactose-free formula**

  This is for lactose intolerant infants. Lactose is a sugar found naturally in milk and standard infant formula. Lactose intolerance can cause frequent loose stools or diarrhoea. Most infants grow out of lactose intolerance or recover within a number of weeks or months. Parents/carers should not change their infant's formula milk unless advised by a health care professional.

- **Pre-thickened formula**

  These formulae have been thickened with starch, guar gum or carob bean gum. Using these formulas can reduce regurgitation and associated losses of milk in infants. However, some regurgitation of feed is normal for infants. Therefore, if an infant is growing well, the first strategy should be to provide smaller volumes of feed more frequently and burp after feeding to reduce regurgitation which occurs due to the inhalation of excessive air during feeding. However, if regurgitation is problematic, a pre-thickened formula may be tried.

- **Hydrolysed or hypo-allergenic formula**

  This is for infants who may be allergic to, or who cannot tolerate particular ingredients in, standard infant formula, e.g. cows' milk protein. **All allergies need to be diagnosed by an appropriate healthcare professional before changes are made to an infant's diet**. Breast milk is the best source of nutrition for infants with allergies. Infants who are breastfed should only be changed to formula if specifically advised by a healthcare professional and only as a last resort.

- **Post-discharge formula**

  This is designed for some formula fed pre-term infants when they are discharged from hospital. It contains higher amounts of some nutrients that a pre-term infant may need at this time. A healthcare professional should specifically advise on the use of this formula depending on each infant's progress. Breast milk is the gold standard for pre-term infants and its promotion should be prioritised.

- **Follow-on formula milk**

  Follow-on formula has more iron and protein than other infant formula milks or regular cows' milk. Follow-on formula is suitable for infants from 6 months of age onwards, and should not be used for infants under 6 months of age. However, infants generally do not need to change to a follow-on formula. Nutritious solid foods are more appropriate sources of extra nutrients from about 6 months of age (see Chapter 4).

Other milks

- **Soya-based formula**

  Soya-based formula is not recommended for infants under 6 months of age. Soya-based infant formula is not suitable for infants with an intolerance or allergy to cows' milk protein or lactose. This is because soy-milk is not considered hypo-allergenic, and reactions to soy-based infant formula have been reported. Soya-based formula milk should only be used for infants who follow a strict vegan diet or under very specific medical conditions, e.g. galactosaemia.

- **Goat's milk-based formula**

  Goat's milk-based formula is not recommended for any infant under 12 months of age. Goat's milk is not considered a suitable source of nutrition for infant formula or follow-on formula. This is because goat's milk is a potential allergen and is not suitable for infants with or at risk of developing allergy.

b. Having all the right equipment

To formula feed infants, the following equipment is needed:

- **Bottles**

  Bottles come in different shapes and sizes. Wide-necked bottles can be easier to fill. It is useful to have about 6-8 bottles, or enough to have a different bottle for each feed over a 24-hour period. This way they can be sterilised in bulk once a day

- **Teats**

  It is generally best to start with a teat designed for newborn infants, but this may change as an infant grows. The ages shown by manufacturers are a guide only. Some infants continue to feed well on the same teat size, while others may require different sizes or flow rates as they get older

- **Bottle brush**
- **Small teat brush**
- **Sterilising equipment**

  Depending on the method of sterilisation chosen, different equipment will be needed (see page 37)

- **Tongs for handling sterile equipment**
- **A clean work surface and a place for washing bottles and equipment**
- **Suitable water for preparing feeds from powdered formula milk**
- **Kettle**

WARNING!

Dishwashers are not suitable for sterilising equipment.

Check teats before each use for signs of wear such as discoloration or thinning. Teats should allow a steady flow of drips when the bottle is turned upside down. Replace the teat if this is not the case.

c. Washing the equipment needed to feed an infant

It is important to wash and sterilise all the equipment needed to feed an infant before each use. Equipment includes bottles, teats, collars (rings), discs, caps and tongs. Washing and sterilising removes harmful bacteria that can grow in the feed and cause illness in an infant.

Washing the equipment

Before starting to wash the equipment, do the following:

1. Wash hands using warm soapy water, rinse and dry well with a clean towel
2. Prepare a clean work surface

Washing the equipment before sterilisation

1. With clean hands, separate the teats, collars, discs and caps from the bottles.
2. Wash all parts of the bottles:
   a. Wash the bottles, teats, collars, discs and caps thoroughly using a clean bottle brush in hot soapy water
   b. Scrub the inside and outside of the bottle, paying particular attention to the rim
   c. Use a small teat brush to clean the inside of the teats or turn it inside out and wash
   d. All traces of milk and any residue must be completely removed. If the milk is not removed, the sterilisation process may not be effective
3. Wash the tongs with hot soapy water.
4. Rinse all the equipment thoroughly in clean running water and place on a clean work surface or directly into the sterilising unit.
5. Rinse the bottle brush and teat brush and leave to dry.
6. After washing, sterilise the equipment before using it.

A dishwasher can be used to wash feeding equipment in preparation for sterilising. The equipment must be dishwasher proof and stacked according to the manufacturers' instructions.

d. Sterilising the equipment needed to feed an infant

Washing feeding equipment by hand or in the dishwasher is not enough. Equipment includes bottles, teats, collars, discs, caps and tongs. If an infant uses a soother, the soother must be sterilised between uses until the infant is one year old. There are 3 ways to sterilise feeding equipment for infants:

a. Steam sterilisation

b. Boiling

c. Sterilising liquid or sterilising tablets

Until an infant is 1 year old, all equipment must be sterilised before each use.

Steam sterilisation

Steam is recommended as the best way to sterilise equipment. Steam contains more energy than boiling water and so it kills bacteria quicker. Steam is also like a gas and can more easily contact all of the equipment surfaces.

An electric steam steriliser or a microwave steam steriliser can be used as follows:

1. Make sure hands and the work surface are clean
2. Follow the manufacturer's instructions
3. Put the washed equipment with the correct amount of water in the steriliser unit. Leave equipment in the steriliser for as long as the manufacturer's instructions indicate
4. Wash and dry your hands, then use a sterile tongs to take the equipment out of the steriliser and place on a clean work surface. Take care as the equipment may be hot
5. If the bottles are not used straight away, put them together immediately using the tongs to keep the teat and the inside of the bottle sterile (see 'Assembling the bottles after sterilising', page 38)

Boiling

1. Make sure hands and the work surface are clean.
2. Use a large saucepan with a tight fitting lid. Keep this saucepan for sterilising only.
3. Put the washed equipment into the saucepan and cover completely with tap water. Make sure that there is no air trapped in the bottles or teats; air prevents the liquid from making contact with equipment surfaces, meaning these areas will not be sterilised.
4. Cover the saucepan with a lid and bring the water to the boil. Boil for at least 3 minutes. Make sure the equipment remains fully submerged in the boiling water at all times.
5. Wash and dry hands. Use a sterile tongs to take the equipment from the saucepan and place on a clean work surface. Take care with any hot equipment.
6. If the bottles are not used straight away, put them together immediately to keep the teat and the inside of the bottle sterile (see 'Assembling bottles after sterilising', page 38).

Sterilising liquid or sterilising tablets

1. Make sure hands and the work surface are clean.
2. Follow the manufacturer's instructions.
3. Make up the solution in a sterilising tank using sterilising liquid or tablets. **Make a fresh sterilising solution every 24 hours.**
4. Put the washed equipment in the solution and make sure that all equipment is completely covered. Make sure there is no air trapped in the bottles or teats so that the solution comes into contact with all parts of the equipment. Trapped air bubbles prevent the liquid from making contact with the equipment surfaces and hence these areas will not be sterilised.
5. Leave the equipment in the solution for as long as the manufacturer recommends.
6. Wash and dry hands, then use a sterile tongs to take the equipment from the solution. Drain the solution from the equipment and place on a clean work surface. **You do not need to rinse the equipment before use**. However, if you wish to rinse it, use water which was boiled for at least one minute and allowed to cool. Take care to avoid scalds.
7. If the bottles are not used straight away, put them together immediately to keep the teat and the inside of the bottle sterile (see 'Assembling bottles after sterilising' on page 38).

Assembling the bottle after sterilising

If you are not using sterilised bottles straight away, put them together immediately to keep the teat and the inside of the bottle sterile.

1. **Remember: Washed hands can be a source of infection. Use a sterile tongs to assemble bottles.**
2. Do not handle any part of the bottle that will come into contact with the milk or the infant's mouth with your hands, e.g. teat and sealing disc.
3. Put the sealing disc on the top of the bottle.
4. Put the teat in the collar.
5. Put the collar containing the teat into the cap.
6. Put the cap containing the collar and teat onto the bottle and tighten securely.
7. Store sterilised bottles in a clean space.
8. **If a sterilised bottle is not used within 24 hours, it must be washed and sterilised again before use.**

e. Using the right water to make up the feed

Use **cold tap water that has been boiled once and then cooled for 30 minutes** to prepare feeds from powdered formula milk.

If tap water is not suitable for drinking even after boiling, **bottled water that contains less than 20mg of sodium per litre can be used** instead. The amount of sodium that the bottled water contains will be written on the label. **Bottled water must be boiled before it is used** to prepare an infant's infant formula feed.

All water must be boiled before use.

Another option is to use ready-to-feed formula milk instead of powdered formula milk. However, ready-to-feed formula costs more than powdered formula.

Water that should never be used to make up a feed includes:

- **Water from the hot tap**

  Hot water straight from the tap will not be hot enough to kill the harmful bacteria which can be present in powdered infant formula. Hot tap water comes from a tank and may have more impurities than water from the cold tap

- **Water that has been boiled more than once**

  Repeated boiling concentrates impurities in the water

- **Fizzy or sparkling water**

  These types of water have a higher mineral content which is not suitable for the immature kidneys of small infants

- **Bottled mineral water (unless less than 20mg sodium/ litre and boiled before use), spring water, filtered water or artificially softened water**

  These may contain higher levels of salts which are not suitable for the immature kidneys of small infants

f. Preparing feeds

The following instructions should be used when advising parents/carers on how to prepare feeds:

Before you start:

1. Pick a time when you are not rushed or too tired. Follow exact instructions when preparing feeds
2. Wash hands with warm soapy water, rinse, dry well with a clean towel
3. Prepare a clean work surface

Preparing feeds using powdered formula milk and hot water

1. Use sterile tongs
   a. As you prepare the bottles, do not touch the sterile teat, sealing disc or the inside of the bottle, cap or collar – even washed hands have bacteria.
2. Use a sterile bottle
   a. Take a sterile bottle directly from the steriliser or open a sterile bottle by twisting off the collar and removing the sealing disc.
   b. Make sure the cap stays covering the teat.

3. Use boiled tap water
   a. Boil fresh tap water in a kettle or a covered saucepan.
   b. Once boiled, allow the water to stand in the kettle or covered saucepan for 30 minutes but no longer. This will make sure the water is at a suitable temperature of 70°C to kill bacteria that may be in the powdered formula.

   c. Only use water that you have boiled once to make up the bottle.
4. The boiled tap water goes into the bottle first. Pour the required amount of boiled tap water into the sterile bottle, using the markings on the bottle to measure.

5. Check the formula milk pack to see how many scoops of powder you need for the volume of water. Always use the scoop provided in the pack.
6. Add the required number of scoops of powdered formula to the bottle of water.
   a. Fill the scoop provided in the pack with powder.
   b. Level the scoop with the leveller in the pack. Don't pack the powder down.

   c. Make sure no powder remains stuck to the scoop.
   d. Reseal the pack to protect it from bacteria and moisture.
7. Put the bottle together.
   a. If the feed is not for immediate use, place the sealing disc on the neck of the bottle first to prevent the milk from spilling.
   b. Put the cap containing the collar and teat onto the bottle and shake well until all the powder is dissolved.

8. Cool the feed quickly to the desired temperature.
   a. Hold the bottle under cold running water or place it in a large container of cold tap water.
   b. Make sure the cold water does not reach above the neck of the bottle during cooling.

   c. Swirl the bottle to distribute the heat evenly.
9. Wipe the bottle dry with a clean towel.
10. Either:
    a. Use immediately
       OR
    b. Store bottles in the back of the refrigerator (at 5°C or below). Bottles of formula should not be stored in the refrigerator door as the temperature is too variable here. Use within 24 hours

11. Discard any feed that has not been consumed within 2 hours of preparation. For slow feeding infants, use a fresh feed after two hours.
12. Don't add ANY extras to the bottle
    Do not put anything other than an infant's milk into the bottle, e.g. never add rusks, cereal, sugar or other food. This practice increases the risk of choking, excessive weight gain and of feeds being over-concentrated.

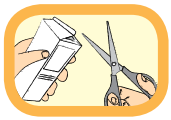
Preparing feeds when hot water is not available, e.g. when travelling

Preparing feeds using ready-to-use formula milk

1. Ready-to-use formula milk is sterile only while the carton is unopened. Ready-to-use formula milk cannot be stored in an open carton.

2. Make sure hands and the work surface are clean.
3. Shake the container of ready-to-use formula milk well.

4. Wipe the top of the container with a clean cloth.
5. Open the container using a clean scissors.



6. Pour the ready-to-use formula milk into a sterile bottle.
7. Put the cap containing the collar and teat onto the bottle and tighten securely. Use immediately. Do not pour the milk back in to the container.

8. When preparing ready-to-use formula in advance, store feeds in a sealed bottle in the back of the refrigerator (at 5°C or below) and use within 24 hours.

Preparing feeds using bottles of cooled, boiled water, i.e. sterile water

1. It is best to prepare bottles of sterile water in advance, after sterilising all necessary equipment. See Steps 1 - 4 of Preparing feeds using powdered formula milk and hot water on pages 38 - 39.
2. Make sure hands and work surfaces are clean.
3. Open a bottle of sterile water, making sure the cap stays covering the teat.
4. Add the correct number of scoops of powdered formula to the volume of water in the bottle.
5. Put the cap containing the collar and teat onto the bottle and tighten.
6. Shake the bottle well until all the powder is dissolved.
7. Use immediately. Feeds made this way cannot be stored.
8. Discard any feed that has not been consumed within two hours of preparation. For slow feeding infants, use a fresh feed after two hours.
9. You can store bottles of sterile water for up to 24 hours. Sterile water does not need to be kept in the refrigerator.
10. If you do not use the water within 24 hours, throw it away and wash and sterilise all the equipment before using again.





Storing and transporting feeds

The following instructions should be used when advising parents/carers on storing and transporting feeds.

If you need to transport prepared feeds, it is important to keep feeds cold during transport.

Short journeys

If the journey time is less than 2 hours, follow the instructions for safe transport below:

1. Prepare the bottles as normal and cool quickly (see 'Preparing feeds' on pages 38 and 39). Store in a refrigerator until ready to be transported
2. Immediately before leaving, place the required number of bottles into a clean insulated cool bag or cool box with an appropriate number of frozen gel packs or ice-packs to keep the bottles cold (at 5°C or below)
3. Put the feeds at the back of a designated refrigerator upon arrival at destination
4. If feeds are brought to a day-care facility, mark each bottle with the infant's name and the date and time it was prepared

Longer journeys

If the journey time will be longer than 2 hours, or if you cannot keep feeds cold (at 5°C or below), it is not safe to transport prepared feeds. The safest option is to bring supplies to prepare feeds.

1. If an infant is likely to need a feed during the journey, use ready-to-use formula milk.
2. If you prefer to use powdered formula, follow instructions in 'Preparing feeds using powdered formula when hot water is not available' (see page 39).

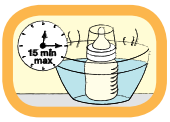
Feeding time

The following instructions should be used when advising parents/carers:

Warming a feed

An infant can be given milk at room temperature once it has not been kept at room temperature for longer than 2 hours. Alternatively, if the feed has been stored in a refrigerator, or if an infant prefers, warm it gently as described below.

1. Make sure hands and the work surface are clean.
2. Make sure the bottle is sealed properly with the cap covering the teat.
3. Place the bottle in a container of warm water or a bottle warmer. The water should not reach above the neck of the bottle.
4. Warm to the desired temperature. **Do not warm the feed for longer than 15 minutes**.
5. The temperature of the milk can be tested by dripping a few drops of the milk onto the inside of the parent's/carer's wrist. **Milk should feel lukewarm, not hot**.
6. Once the feed is warmed, remove it from the warm water and use immediately.
7. Discard any feed that an infant does not take within 2 hours. Never re-use or re-heat feeds.



Feeding an infant

1. Never leave an infant alone with a bottle or prop the bottle up and do not leave an infant with a bottle in bed. Feed an infant then take the bottle away.
2. Infants feed according to their appetite. Do not force an infant to take more than they want or to finish the amount prepared.
3. **Table 12** is a guide on how much fluid an infant should consume on an average day.

WARNING!

Never use a microwave to warm feeds. Hot spots can form in the milk which can scald an infant's mouth.

Table 12. Average Daily Fluid Intake of Infants during the First Year of Life

Age (months)	Average number of feeds over 24 hours	Daily fluid intake (mls) per kilogram (kg)
0 – 3	6 to 8 (feed every 3 to 4 hours)	150mls per kg (2.5 fluid oz per lb)
4 – 6	4 to 6 (feed every 4 to 6 hours)	150mls per kg (2.5 fluid oz per lb)
7 – 9	4	120mls per kg (2 fluid oz per lb)*
10 – 12	3	110mls per kg (1.7 fluid oz per lb)*

* From 6 months, fluids besides milk (such as cooled boiled water) are part of an infant's total fluid intake (see 'Other fluids,' page 25)

Vitamin D supplementation for infants

All infants, including formula fed infants, should receive **5µg (200 IU) of vitamin D_3 as a supplement daily** throughout the first year of life.

- Parents/carers should be advised to consult their pharmacist for advice on the most suitable vitamin D_3 supplement for their infant. The product should contain vitamin D_3 only and be in a liquid form suitable for infants.
- Instructions must be read carefully to ensure that the correct vitamin dose is provided each day as the number of drops or amount of liquid required to provide the recommended 5µg (200 IU) daily is different for each product.

For further information on vitamin D supplementation during infancy, see page 25.

What is the bottom line in terms of formula feeding?

1. *Breastfeeding is the **biologically normal and best way** of feeding infants.*

   The vast majority of mothers can breastfeed and the breast milk produced will provide their infants with complete nutrition for about the first six months of life. However, any amount of breastfeeding is beneficial for infants. Even if a mother chooses not to breastfeed long-term, mothers should be encouraged to breastfeed in the days immediately following birth, so that the immunity in the first milk (colostrum) is passed onto the infant.

2. *Choosing the **right infant formula***

   If an infant is not being breastfed, a standard infant formula should be used throughout the first year of life. Specialised milks should only be used if advised by a healthcare professional.

3. *Having all the **right equipment***

   Equipment needed to prepare bottles includes steriliser, bottles, teats, collars, discs, caps and tongs. A suitable area to wash, sterilise and store feeds is required.

4. *Any **equipment** needed for preparing, storing or feeding infant formula milk should be washed and sterilised.*

   Infants are vulnerable to illness. Therefore bottles, teats, and any other equipment used must be washed and **sterilised before use**. For further information, see page 37.

5. *The right water must be used to make up feed.*

   The water used to make feeds must be hot enough to kill bacteria in the water and in the powdered infant formula. Drinking cold tap water which has been boiled once and cooled for 30 minutes should be used. For further information, see page 38.

6. ***Preparation guidelines*** *for formula milk should be strictly adhered to.*

   All equipment must be sterile and bottles should not be touched with hands. The right water must be used and the required number of scoops of powdered formula added using the scoop provided in the pack.

7. *Guidelines for storing and transporting feeds should be strictly adhered to.*

   Formula feeds must be stored and transported at the right temperature to prevent the growth of harmful bacteria which may cause illness.

8. *Feeding time*

   Parents/carers should be aware that different infants take different amounts of formula and have their own feeding routines. Parents/carers should know how to avoid scalds, how to keep formula milk fresh and how to correctly position the infant during feeding.

9. *All infants should receive* ***5µg (200 IU) of vitamin D_3*** *as a supplement daily.*

   Between 0-12 months, infants grow very quickly and sufficient vitamin D is required to form strong bones. An infant's diet, whether breastfed, formula fed or taking solid foods (or a combination of these), does not commonly include sufficient vitamin D, therefore daily supplementation is required.

Further information

- HSE 2010, Vitamin D and your baby – www.healthpromotion.ie
- Safefood 2012, How to prepare your baby's bottle – www.safefood.eu
- INDI 2010, Bottle Feeding your Baby – www.indi.ie

3.2 Questions Parents/Carers often ask about Formula Feeding

Are my baby's bowel habits normal?

Bowel habits vary from infant to infant

The pattern of dirty nappies can vary. Some infants may have one or more dirty nappies every day; others may have one every few days. Once feeding is established, infants will settle into their own routine. As long as an infant is thriving and growing well, this is fine.

What the stools should look like

Breastfed infants tend to have softer, looser stools which are mustard yellow in colour.

Formula fed infants tend to have firmer and more formed stools which are darker in colour.

What is constipation in an infant?

Constipation is delayed or difficult defaecation. To determine constipation in an infant, query the following:

1. The consistency or hardness of the stool

   Constipated stools are firm, dry pellets which do not soak into an infant's nappy

2. Straining at stool

   Straining at stool is normal for infants, but straining with crying can be a sign of constipation

Managing constipation in an infant

If an infant more than 2 weeks old appears to be constipated, follow the steps below:

1. Complete a medical history and physical exam and investigate occult blood (if indicated)
2. If any of the following signs are present, arrange a consultation with a specialist:
   - Delayed passage of meconium
   - Anal stenosis
   - Fever
   - Tight empty rectum
   - Vomiting
   - Impaction
   - Bloody diarrhoea
   - Distension
   - Failure-to-thrive

3. If an organic cause for constipation has been ruled out, advise on the following areas as appropriate:

a. Preparation of powdered infant formula

Over-concentration of infant formula can cause constipation. Ensure that powdered infant formula is correctly prepared (see pages 38-40), highlighting that:

- The correct number of scoops of formula must be added to the correct volume of water (1 scoop of formula to every 30mls (1 fl. oz.) cooled boiled water)
- Scoops to measure out powdered formula should not be swapped between types or brands of formula since they may not be the same size
- Solids, e.g. rusks or baby rice, should never be added to an infant's bottle

b. Adequate fluid intake

Inadequate fluid intake is the most common cause of constipation in infants.

- See **Table 12** (page 41) for a guide on an infant's fluid requirements – ensure that these daily fluid requirements are being met.

c. Additional fluid in the diet

If an infant is reaching their estimated fluid requirements, additional fluid can be provided:

Age of infant (months)	First line of action	If constipation fails to resolve
0 – 2	Offer 30mls cooled boiled water 1-2 times per day	150mls per kg (2.5 fluid oz per lb)
2 – 6	Offer 30-60mls cooled boiled water twice a day	Offer 30-60mls of a diluted juice that naturally contains sorbitol, e.g. prune, pear or apple juice, twice a day. Juice should be diluted in the ratio of 1 part juice to 3 parts water, i.e. 60mls diluted juice = 15mls pure juice and 45mls cooled boiled water.

See page 63 for information on treating constipation in infants aged 6-12 months

d. Non-dietary treatment for constipation

In conjunction with the dietary treatments listed above, techniques to stimulate bowel movement may also be tried:

- Massage an infant's tummy in a clockwise direction, making firm but gentle circular motions from the belly button outwards.
- Put an infant lying on their back. Gently move the infant's legs backwards and forwards – in a 'bicycle' motion.
- Give an infant a warm bath to relax the bowel.

e. Treatment with medication

- If education and diet (a + b + c previously) are unsuccessful, GP should consider treatment with medication, e.g. lactulose, malt extract, or glycerine suppository.

What if my baby brings up some feed?

Bringing up some feed after feeding – called 'posseting' – can be normal. However, to help reduce this, advise the following:

1. Raise the infant's head slightly above the level of their tummy after feeds, e.g. place a folded towel under the infant's mattress or a book under the cot legs
2. Avoid pressure on the infant's tummy after feeds
3. Do not bounce or handle the infant too much after feeds
4. Do not let the infant slouch after feeds, e.g. in a car seat
5. Dress the infant in loose fitting clothes and avoid tight waist-bands
6. Help the infant avoid trapped wind (see question below)
7. Check that you don't give an infant too much feed at any one time. Smaller, more frequent feeds may help
8. If an infant is taking spoon feeds, give them at separate times to milk feeds so that an infant's tummy does not become too full

If regurgitation of feed persists despite the suggestions above, refer the infant to the appropriate healthcare professional to address any possible underlying issues.

How can I help my baby avoid swallowing air during feeding?

1. Make sure an infant is in a **good, well-supported upright position** during feeds.
2. After shaking the bottle, **allow air bubbles in the milk to settle** before feeding.
3. **Tilt the bottle** so that the neck of the bottle and teat are always full of milk during feeds.
4. Make sure the **flow rate from the teat is suitable**. There should be a steady flow of drips when the bottle is turned upside down. If the flow rate from the teat is too slow or too fast, signs such as rapid swallowing, very hard sucking on the teat, or milk leaking from the infant's mouth, will be seen.
5. Check that an infant has a **good seal around the teat** with their lips. It can help to remove the teat from the infant's mouth from time to time during feeds to stop the teat collapsing.
6. Use a **teat with an anti-colic valve**. If wind is particularly problematic, these teats help to decrease the amount of air swallowed by an infant during feeding because they don't collapse.

How can I help my baby pass trapped air?

If an infant has trapped air and is unable to pass it themselves, suggestions to help include:

1. **Sit the infant upright on your lap** and gently rub their back until they burp; **or**
2. **Hold infant up to shoulder** with their back straight and rub their back until they burp
3. Have a tissue/towel handy as a little milk may come up – this is normal

What can I do if my baby seems to cry a lot?

Common reasons for crying

- Trapped wind
- Wet or dirty nappy spacing
- Being over-tired or over-stimulated
- Feeling lonely or bored
- Feeling too hot or too cold
- Hunger or thirst

To address crying, consider causes other than hunger first, especially if an infant is not due a feed. If an infant has just had a feed, ensure that you **help the infant pass any trapped air**. If necessary, try the following in addition to this:

1. Gently rock the infant
2. Put the infant in a warm bath
3. Place a warm towel on the infant's tummy
4. Gently massage the infant's tummy in a clockwise direction
5. Lie the infant down and bring their knees towards their tummy in a gentle cycling motion

If you find it hard to cope with your infant's crying

1. Take time out. Place the infant in their cot and take a short break.
2. Seek support. Ask someone you trust to care for the infant to give you a rest.

If the crying continues or sounds unusual, or is there are concerns that an infant is not growing well or is ill, refer infant to the appropriate healthcare professional to address any possible underlying issues.

Excessive crying in an otherwise healthy infant may be characterised as colic – For further information, see page 26.

Chapter 4

Weaning an Infant onto Solid Food

4.1 Weaning

Weaning is the introduction of solid food into an infant's diet during the first year of life. During this process, the infant will progress from breast milk or formula milk only to a fully mixed diet with foods of different textures and tastes. The goal of the weaning process is that by one year of age, an infant will be eating modified family foods, i.e. foods with no added gravy, sauces, or salt.

Current weaning practices

Research has shown that weaning practices which are at variance with best practice guidelines remain prevalent in Ireland today. Over 20% of mothers in Ireland wean their infants onto solid food prior to 12 weeks of age – this is too early for solid food introduction. It has also been reported that unsuitable additions to infant foods such as ordinary gravy, sugar, honey, and sauces are being given to infants who are 6 months of age or less. Such findings indicate that a significant proportion of 6 month old Irish infants consume foods high in energy, saturated fats, salt, and refined sugars; all practices which may result in bad feeding habits and have adverse consequences for health in later life.

Why is it important to give infants solid foods?

An infant's birth weight doubles by six months and triples by one year, a process not repeated at any other phase of the life cycle. A nutritious and adequate infant diet is required to support this.

By 6 months of age, an infant's stores of nutrients such as iron, zinc and some fat soluble vitamins (A and D) are decreasing and nutritional requirements are increasing. At this stage, neither human breast milk nor infant formula milk intake alone are sufficient to meet an infant's nutritional needs. Therefore, to support continued growth and development throughout infancy, the introduction of solid foods to the diet is essential.

When should an infant be weaned?

Generally the introduction of solid food to an infant's diet should take place at about 6 months of age. The recommendations for the age of weaning are the same for both breastfed and formula fed infants. The exact timing to begin this process should be driven by the unique needs of the individual infant.

When should a term infant be weaned onto solid food?

Weaning should begin close to 6 months (26 weeks) of age. The timing of introducing solid food depends on each infant's nutritional and developmental needs. Each infant will show signs of readiness. It is safe to give infants solid food after 4 months (17 weeks) of age but not before this time.

When should a pre-term infant be weaned onto solid food?

Weaning should commence between 5 to 8 months of actual birth date. In general, pre-term infants benefit from delaying the introduction of solid foods until at least 3 months after their estimated date of delivery (EDD). The weaning process should follow the same course as for the term infant.

The reasons why solid food should be introduced at about 6 months of age

It is recommended that parents/carers introduce their infant to solid food at about 6 months of age. Infants should not be introduced to solid food before 4 months (17 weeks) of age and the start of weaning should not be delayed past 6 months (26 weeks) of age.

Table 13. Why it is Important to Introduce Solid Foods at about 6 Months of Age

Why not too early?	Why not too late?
Not before 4 months (17 weeks)	**Not after 6 months (26 weeks)**
• An infant's kidneys and digestive system are immature and may not be able to handle food and drinks other than milk • Increased risk of coeliac disease, Type 1 Diabetes Mellitus and wheat allergy	• Delay the learning of important skills necessary for eating a mixed diet • Due to their small stomach size, an infant cannot drink enough milk to meet their energy needs. Nutritious food is needed to meet their energy and nutrient requirements • Iron stores from birth are used up by age 6 months. Iron must be consumed from the diet • Research indicates that introducing gluten after 7 months (26 weeks) of age increases the risk of coeliac disease, Type 1 Diabetes Mellitus and wheat allergy

The signs indicating an infant is ready to start eating solid food

These developmental signs are generally seen between 4 and 6 months (17 and 26 weeks) of age when an infant:

- Does not seem satisfied after a milk feed
- Starts to demand feeds more frequently over a time period of more than one week
- Shows an interest in food – may be reaching out for food
- Watches others with interest when they are eating
- Chews and dribbles more frequently
- Is able to sit up with support, and head control is evident

The stages of weaning

The weaning process takes place in three stages, starting with the first spoon feeds when the infant is 4-6months old and finishing at 12 months.

Stage of Weaning	Food textures appropriate during each stage of weaning	Skills learned through each stage of weaning
STAGE 1 From about 6 months of age	'First foods' should be thin purées which will increase in thickness as the infant progresses (see page 52 for more detail on this stage).	• Taking foods from a spoon • Moving food from the front to the back of the mouth for swallowing • Managing increasingly thicker purées
STAGE 2 Between about 6 – 9 months of age	Move from thick purées to mashed foods to foods with soft lumps, and finally to soft finger foods. Infants should also start drinking from a cup (see page 55 for more detail on this stage).	• Moving lumps around the mouth • Chewing lumps • Self-feeding bite-sized pieces of food using hands and fingers
STAGE 3 Between about 9 – 12 months of age	Move to minced and chopped family foods. More textured finger foods should be offered. A non-lidded beaker should be used for all drinks other than breastfeeds. If an infant is being formula fed they should no longer use a bottle by age 12 months (see page 59 for more detail on this stage).	• Chewing minced and chopped foods • Self-feeding bite-sized pieces of food using hands and fingers • Learning to eat with a spoon • Drinking fluids from a cup

What foods should parents/carers aim to include in their infant's diet throughout the weaning process?

Foods rich in iron are important for infants

Why are foods rich in iron important?

Having enough dietary iron is important to help an infant to grow and develop, and to prevent iron deficiency anaemia. From about 6 months of age, an infant's store of iron accumulated from their mother during pregnancy is depleted, so rich dietary sources of iron become very important. Iron-rich food sources should be offered early in the weaning process to help ensure infants get the nutrition they need.

What foods are rich in iron?

There are two types of iron in food: haem iron and non-haem iron. Haem iron is more easily absorbed by the body and non-haem iron is less easily absorbed by the body.

Cured meats such as ham and bacon should not be given to infants. These meats are high in salt and contain additives which are unsuitable for infants. Also, liver should not be given to an infant because it contains too much vitamin A.

Table 14. Suitable Sources of Iron in the Diet

Sources of haem iron	Sources of non-haem iron*
• Red meat, e.g. - beef - pork - lamb • Poultry	• Eggs (well-cooked) • Peas • Beans • Lentils • Green leafy vegetables, e.g. spinach, broccoli

* Eating foods rich in vitamin C at the same time as foods which contain non-haem iron improves iron absorption from these foods. Good sources of vitamin C include fresh fruits, e.g. oranges, lemons, limes, grapefruit, blueberries, blackberries, kiwis, and fresh vegetables.

What foods reduce iron absorption?

Phytates reduce iron absorption and are found in fibre-containing foods such as bran, wholegrains, tofu and beans. Small amounts of wholegrain foods and beans should be included in an infant's diet. However, **bran should never be given to infants**. Bran is a very high-fibre food – it can impair the absorption of vital nutrients, such as iron and calcium, and decrease an infant's appetite for meals.

Tannins in tea (even decaffeinated tea) and coffee also reduce iron absorption and should never be given to infants.

Foods rich in long chain omega-3 polyunsaturated fatty acids (PUFAs) are important for infants

Why are foods rich in long chain omega-3 PUFAs important?

Consuming enough foods rich in long-chain omega-3 PUFAs such as docosahexaenoic acid (DHA) is important for the brain and eye development of infants. During weaning, an infant's DHA levels can drop due to lower levels of DHA commonly found in the weaning diet compared to relatively higher levels found in breast milk and formula milk. EFSA recommends that infants between the ages of 7 to 12 months should consume **100mg of DHA per day (700mg of DHA per week)**.

What foods are rich in omega-3 PUFAs?

Oily fish such as salmon, trout, herring, mackerel and sardines are rich sources of omega-3 polyunsaturated fatty acids. Tinned, fresh or frozen fish are all good choices. Green leafy vegetables and omega-3-enriched eggs may be suitable for vegetarian babies. **Table 15** outlines the DHA content of a standard portions (30g) of commonly consumed fish.

Including two 30g (1oz) portions of oily fish in an infant's weekly diet from about 7 months of age will help the infant meet their requirements for omega-3 PUFAs.

Table 15. DHA Content (mg) of a 30g (1oz) Portion of Commonly Consumed Fish

Fish (30g)	DHA (mg)
Salmon*	621
Trout*	687
Herring*	377
Mackerel*	160
Sardines*	226

* Remove all bones

Note: Breast milk and formula milk contain omega 3 PUFAs

All fish are safe for infants to eat with the exception of predatory fish such as shark, marlin, ray and fresh tuna, which are rarely eaten in Ireland. These named fish contain high levels of potentially harmful contaminants such as mercury and should not be offered to infants.

Fish can be prepared to a texture suitable for any stage of the weaning process. For tips on preparing weaning foods at home, see page 50.

Foods rich in vitamin D are important for infants

Why is vitamin D important for infants?

Vitamin D is needed to help absorb calcium in the body and therefore is essential for good bone health. In addition to this, some research has linked low levels of this vitamin with heart disease, diabetes and the metabolic syndrome. Vitamin D can be made in the skin when the skin is exposed to ultraviolet (UV) light from the sun's rays. However, **infants should never have their skin exposed to the sun because of the risk of skin cancer**.

How can an infant get enough vitamin D?

The typical diet of an infant in Ireland alone will not provide enough vitamin D

1. **Vitamin D supplementation**

   All infants in Ireland should be given a DAILY supplement of **5µg (200 IU) vitamin D_3** for the first 12 months of life.

   - Parents/carers should be advised to consult their pharmacist for advice on the most suitable vitamin D_3 supplement for their infant. The product should contain vitamin D_3 only and be in a liquid form suitable for infants.
   - Instructions must be read carefully to ensure that the correct vitamin dose is provided each day as the number of drops or amount of liquid required to provide the recommended 5µg (200 IU) daily is different for each product.

   See page 25 for further details on Vitamin D supplementation in infancy.

2. **Vitamin D in the infant diet**

   In addition to supplementation, suitable dietary sources of vitamin D should be provided in the infant diet once the process of weaning onto solid food commences.

   Foods which contain vitamin D and are suitable for infants include oily fish such as herring, salmon, mackerel, trout, sardines, and eggs and fortified cereals. Oily fish is a particularly good source of vitamin D and should be included in the infant diet twice a week. All of these foods can be prepared to a suitable texture depending on the stage of weaning an infant is at.

Further information

HSE, 2010, *Vitamin D and your baby* – www.healthpromotion.ie

Restrictive diets during infancy

Vegetarian, vegan and restrictive diets during infancy

Infants have different requirements than adults due to the need for growth and development. Parents/carers of infants following a vegetarian or vegan diet need to consult a dietitian to ensure that the diet is providing the infant with all the nutrition required. In general, restrictive diets are not recommended for infants.

High-fibre, low-fat diets during infancy

High-fibre, low-fat diets are not appropriate for infants. High-fibre diets (including unprocessed bran, fibre enriched cereals and high-fibre seeded or granary bread) tend to be bulky and low in energy density. Low-fat diets which are recommended for older individuals are also unsuitable for infants because a certain amount of fat is needed to provide the energy essential for growth. Infants have high nutritional requirements but have a relatively small capacity to consume food. Therefore, priority needs to be given to energy-dense and non-bulky nutritious foods such as red meat, poultry, fish, plain yoghurt (made from whole milk), cheese, and whole milk.

Foods that should never be given to infants

1. **Honey should never be given to an infant less than 12 months of age**

   Honey may contain spores of the bacterium *Clostridium botulinum*, which can cause a serious illness called infant botulism.

2. **Unpasteurised cheese, e.g. brie, blue cheese**

   The label will state 'Made from raw milk' or 'Made from unpasteurised milk'. Bacteria found in these cheeses can cause serious illness in vulnerable individuals, such as infants.

3. **Undercooked eggs**

   Only well-cooked or hard-boiled eggs should be provided to infants. The yolk in a fully cooked egg is hard, cooked all the way through, and pale yellow in colour. Infants are more vulnerable to illness and undercooked eggs can contain *salmonella*.

4. **Bran**

   Bran is a very high source of dietary fibre. Large amounts of fibre can reduce the absorption of important micronutrients such as iron, calcium and zinc and can be difficult for an infant to manage.

5. **Tea**

   Caffeinated, decaffeinated, and herbal teas should not be included in an infant's diet. These fluids contain caffeine and tannins which reduce the absorption of important micronutrients such as iron and calcium.

6. **Salt**

   High-salt foods and the addition of extra salt to an infant's diet during the first 12 months should be avoided. Evidence suggests that early salt intake may have a persistent long-term effect on blood pressure, independent of salt intakes in later life. Also, limiting the amount of salt in an infant's diet is very important to decrease the 'taste' for salt in later life. Salted foods, gravy, commercial sauces, salted butter and all stock cubes should be avoided in the infant diet.

7. **Processed meats**

   Processed meats such as ham, bacon, sausages and rashers should not be included in the infant diet. These meats are high in salt and contain additives which are unsuitable for infants.

8. **High-fat and high-sugar foods**

   Infants naturally prefer sweet, high-fat foods. However, such foods are unnecessary in the diet and should be avoided to help reduce the risk of overweight, obesity and tooth decay. Foods high in sugar contribute significantly to the development of tooth decay, particularly if eaten frequently during the day/between meals. The capacity of an infant's stomach is small and offering an infant these types of foods will displace more nutritious food in the diet. Nutritious savoury and plain foods should be offered.

9. **Whole or chopped nuts**

   Whole or chopped nuts should not be given to children under 5 years of age due to the risk of choking.

Worried about allergy?

NEVER AVOID particular foods due to a suspected food allergy or intolerance. This can lead to a restricted diet and a poor intake of important nutrients.

All allergies need to be diagnosed by a doctor. If an infant does have an allergy or intolerance to a certain food, see a dietitian to make sure the infant's diet provides them with the necessary foods for healthy development.

Homemade weaning foods

By preparing homemade weaning foods you know exactly what your infant is eating and the infant will become familiar with the taste of homemade foods from an early age. Homemade foods can be relatively cheap to prepare compared to shop bought baby food.

Preparing homemade foods

Fruit

1. Wash fruit under cold running water.
2. Peel and cut into small pieces discarding core/pips/seeds/stone.
3. Stew fruit in a small amount of water. Ripe fruit requires less heat and water to soften.
4. Liquidise, purée or mash depending on the stage of weaning, e.g. using a hand blender, mixing manually to form a paste or other texture, using a mouli etc.
5. Correct texture with breast milk or formula milk.

Vegetables

1. Wash vegetables under cold running water.
2. Peel, trim and slice.
3. Steam or boil (in small amounts of water) vegetables. This is the best way to minimise any loss of vitamins and minerals.
4. Liquidise, purée or mash depending on the stage of weaning.
5. Correct texture with breast/formula milk as appropriate.

Meat, poultry, fish (make sure to remove all bones) or pulses

1. Stew, bake, steam, grill or boil until tender, just as you would prepare family meals.
2. Fully cooked tender meat/fish can be liquidised, puréed or mashed depending on the stage of weaning.
3. Combine with pureed vegetables/rice/potatoes/pasta and correct texture with breast/formula milk as appropriate.

Useful tips

- All equipment used in food preparation must be sterilised until the infant is 6 months of age.
- Prepare infant meals in bulk, and then freeze small portions in ice-cube trays. Have a tray for each of the following groups: Potato/pasta/rice, Vegetables/fruit and Meat/ poultry/fish/pulses.
- Before freezing, make sure that the trays are covered, e.g. cling film, tin foil, zip lock bags etc., labelled and dated correctly with a waterproof marker.
- Rotate the foods according to date, and ideally use meals within a month for better taste and nutritional value.
- Do not re-freeze any foods once they have been taken from the freezer and thawed.
- Reheated food must be piping hot the whole way through. Be particularly vigilant using microwaves as food can heat unevenly producing 'hot spots'. This can be avoided by stirring the food and leaving it to cool slightly after heating. The temperature of the food should be tested by the parent/carer before offering it to the infant.
- Do not reheat food more than once.
- Do not keep an infant's unfinished meal for a later meal as saliva introduced from an infant's spoon can breed bacteria.

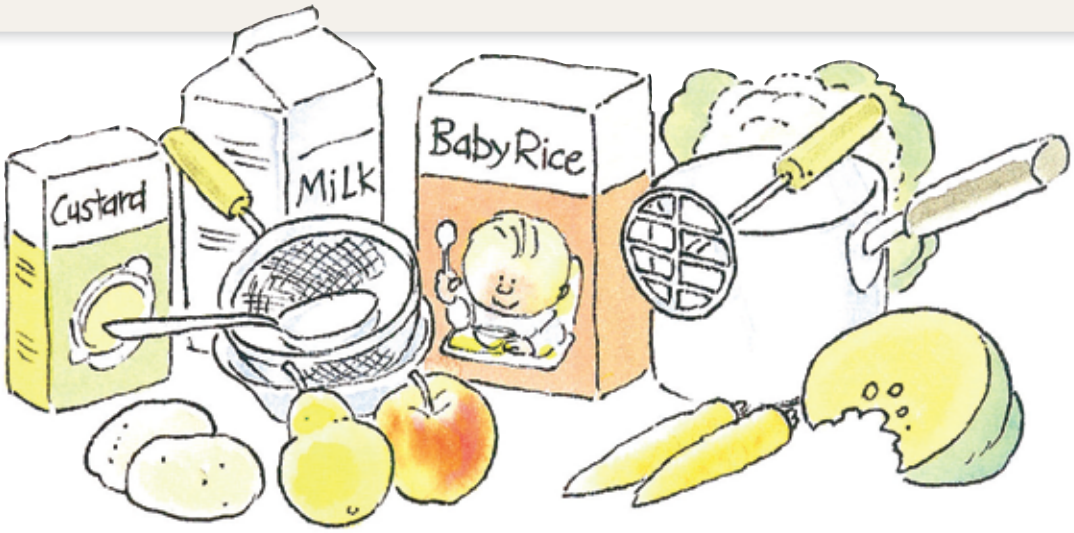
Remove the infant's food portion before additions such as salt, sauces and gravy are made to family meals.

Alternatives that can be used to modify texture include breast milk, formula milk, cows' milk (from 6 months onwards) and vegetable water.

A note on commercial baby foods...

Commercial baby foods are widely available and can prove to be useful when travelling or eating away from home. However, commercial baby foods are relatively expensive compared to homemade weaning foods.

If commercial products are being used, parents/carers should be advised to choose savoury meals. Sweetened desserts and puddings are not in line with best practice in infant feeding as they are primarily based on added sugar and fat. Other commercial products such as sauces, gravies and dishes containing processed meats, e.g. sausages, are also unsuitable for infants due to their high salt content. For infants younger than 6 months of age, all foods should be gluten-free.



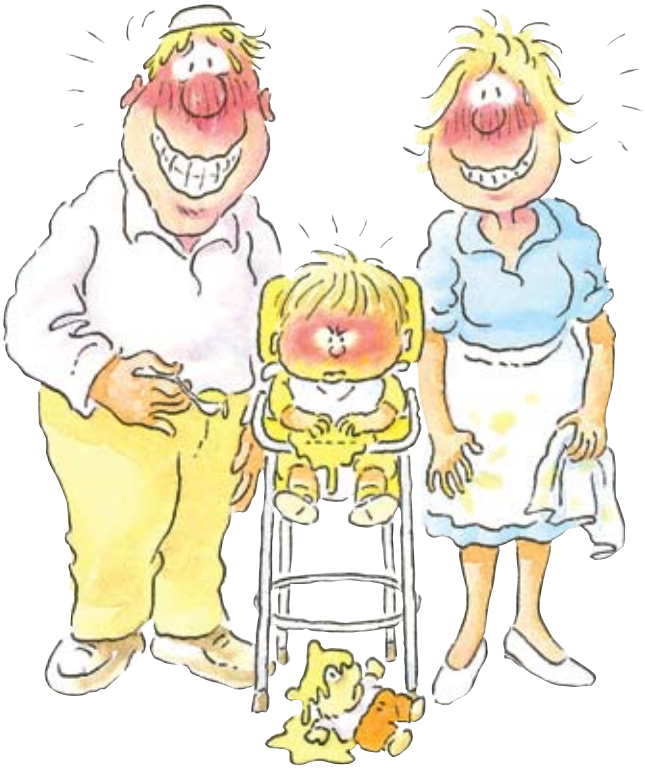
4.2 Stage 1 of Weaning (about 6 months) – Puréed Non-milk Foods

What should parents/carers expect at this stage?

The very early stage of weaning is about exploration. During this stage it is important that an infant becomes familiar with taking foods from a spoon. Parents/carers should expect both a mess and some food waste as infants get used to this new experience of eating. This can take time and parents/carers should be patient and reassured as necessary.

Infants who start weaning at 6 months of age will move through Stage 1 more quickly than infants who start weaning at a younger age.

When solid foods are added to an infant's diet, his or her stools may change colour and odour. This is normal.



What types of foods should be offered during this stage?

1. One new food should be introduced at a time with each new food spaced 1-2 days apart. New foods should ideally be given early in the day so that parents/carers can watch for any possible reaction to the food during the day.
2. The food offered should become increasingly varied so that an infant can experience different tastes and flavours.

Suggestions for first foods

1. **Gluten-free cereal**, e.g. baby rice
2. **Vegetables made into a purée**, e.g. carrot, parsnip, turnip, broccoli, cauliflower, butternut squash, courgette
3. **Fruit made into a purée,** e.g. banana, stewed apple, pear, peaches, apricots, plums, melon
4. **Meat, poultry and fish purées**, e.g. red meat such as lamb and beef (see page 47 for information on importance of including iron rich foods in an infant's diet)

Meat is a 'safe' food and can be tolerated by infants as soon as they are accepting spoon feeds.

Meat can be blended or mashed so that it is the right texture for the infant no matter what stage of weaning they are at (see page 50 for details on how to prepare meat for weaning).

Preparation of infant foods during the first stage of weaning

1. Blend the food with breast milk, formula milk or cooled boiled water until it is a smooth and runny consistency. The infant's usual milk (breast milk or formula milk) should be used to modify the texture of the food - the infant will recognise the taste. Once the infant is 6 months of age, small amounts of pasteurised full-fat cows' milk can be used to prepare weaning foods.
2. Pass the food through a sieve to remove any lumps.
3. Foods should be the same texture throughout. **Do not mix food textures at this stage**.
4. In general, butter/dairy spread should not be added to an infant's food. In exceptional cases, where adding butter may be of benefit, the advice of a dietitian should be followed.
5. Infants should not be given high-salt or highly-processed foods, e.g. gravies and sauces.
6. Foods can be prepared in bulk and frozen in small portions using sterilised ice-cube trays (see page 51).

Stage 1 represents the first 1-2 weeks of introducing solid food to an infant's diet. During this introductory period the texture of food offered should progress from a runny (semi liquid) and absolutely smooth consistency to a slightly thicker purée with no lumps.

What type of equipment is needed to feed an infant solid food?

- Small plastic baby spoon
- Fork and sieve
- Small bowl
- Blender/Liquidiser
- Steriliser for bowls and spoons
- Non-lidded Sippy™ cup

Getting ready to feed an infant their first foods

1. A suitable time to feed an infant, i.e. have plenty of time available.
   a. Eliminate distractions and turn off the television and radio.
   b. Offer the infant some of their milk feed first so that he/she is not too hungry to accept this new way of feeding. The rest of the milk feed can be offered after the spoon feed if the infant is still hungry. Alternatively, foods can be offered between milk feeds so that the infant is not too hungry or full.
2. Use a high chair and table once an infant can sit up unsupported.
3. Position an infant so that they are well-supported and can see their parents/carers face.
4. Having spare feeding bibs, a damp cloth, a towel and a floor mat can be helpful. Parents/carers should be advised not to worry about the mess.

Feeding an infant their first foods

1. If food is very hot, allow it to cool slightly, stir it and advise the parent/carer to test the temperature before giving it to the infant.
2. Allow the infant to touch the food, the spoon and the bowl if they want. Expect a mess.
3. Present the infant with small spoonfuls. It is easier for the infant to move small volumes around their mouth.
4. An infant may reject food initially. Give them food to play with and try small amounts from a spoon again the next day when they are relaxed. A parent/carer can try some of the food so the infant can see the process.
5. If the infant refuses a new **variety** of food, do not try to force them to eat it. Instead, offer another food they are familiar with and wait 5-7 days before offering the refused food again. Infants may need to be offered a particular food up to 15 times at any stage of weaning before they accept it.
6. Never leave an infant alone during feeding. Ideally, feed the infant during family meals so they can watch and learn from the family's example.

How much food should be given in a meal?

1. Start with 1 teaspoon of food made into a soft smooth purée.
2. Slowly build up the amount of non-milk food given at one feed. When the infant is taking about 6 teaspoons at one time, add in a second spoon feed at a time of the day that suits best. The aim is to gradually build up to 2-3 spoon feeds per day during this stage of weaning.
3. Healthy infants are generally good at knowing when they have had enough to eat. Parents/carers should watch carefully for signs that the infant has had enough to eat and should never force them to finish food.

Signs indicating the enfant has had enough to eat

1. Loses interest in the food and gains interest in the surroundings
2. Does not open mouth when the spoon comes
3. Turns head away from the spoon or food and looks bored
4. Cries

What fluids should an infant be given during this stage?

- Breast milk should be used as the main milk drink for the first year of life. If breast milk is not available, standard infant formula should be used.
- Cooled boiled water can be offered as extra fluid.

Using a bottle for too long can cause problems with dental health and can lead to feeding problems later.

Fruit juices are not needed. However, if parents/carers choose to offer juices, only small amounts of well-diluted, unsweetened fruit juice (dilute 1 measure of pure juice to 8-10 measures of cooled boiled water) should be given from a beaker at mealtimes or with snacks from 6 months onwards.

Cows' milk should not be offered as the main milk drink until:

- A term infant is one year of age; and
- A pre-term infant is at a corrected age of 12 months old

Low-fat milk should not be given to children under 2 years and skimmed milk should not be given before 5 years of age

For more information on other fluids suitable during the first year of an infant's life see page 25.

Introducing a cup or beaker

Introducing a cup or beaker is a gradual process that can start from about 6 months of age onwards. An infant will need help with this initially and some mess is to be expected. To begin this process, fluids other than breastfeeds, can be offered from a lidded beaker with a non-valved, free-flowing spout. The aim should be that by 12 months of age, **a non lidded beaker** will be used for all drinks other than breastfeeds.

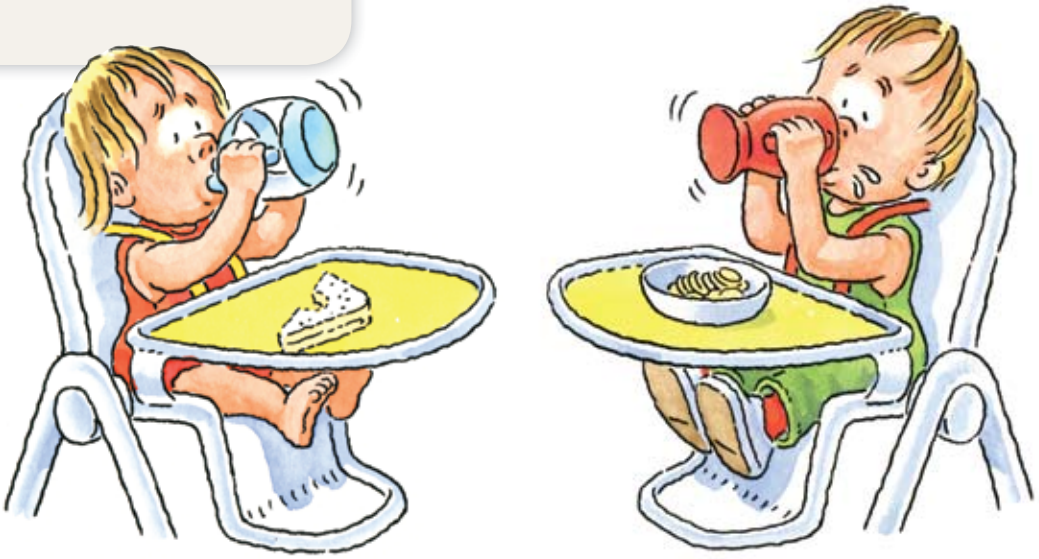
All bottles will be discontinued by 12 months of age and the infant can start adjusting to a non-lidded beaker.

Goals of Stage 1

Texture: Slightly thicker purée without lumps

Number of meals per day: 2-3meals per day. Approximate size of each meal 5-10 teaspoons

Milk feeds: Breastfeed on demand or give usual amount of formula offering solids during or after feed.



4.3 Stage 2 of Weaning (6 – 9 months) – Thicker Purées, Mashed Food and Soft Finger Foods

What should parents/carers expect at this stage?

Once first spoonfeeds are tolerated (after about 2-3 weeks), a wider variety of more textured foods can be provided. Infants first introduced to solid foods from 6 months onwards should move more quickly to thicker purées and mashed foods. Milk feeding is still important during this time, and infants should be getting about 4 milk feeds during the day. Breastfeeding both throughout the process of weaning and the introduction of gluten is thought to help protect infants against coeliac disease and diabetes in adult life (see page 57).

What types of foods should be offered during this stage?

Offering a wide variety of foods and appropriate textures during this time has been shown to increase the variety of foods accepted by the child later on.

Avoid remaining too long at any stage of weaning.

Introduce new textures into the diet at a pace an infant is comfortable with. However, keep moving forward with the weaning process – introduce new textures at the recommended times.

Suggestions For Suitable Foods During Stage 2 of Weaning

Cereals, potatoes, pasta, and rice

- Baby rice, baby porridge, cornmeal porridge
- Mashed potato, pasta, rice, bread

Meat, poultry, and fish

- Stewed/baked/steamed/boiled/grilled fish (remove bones), beef, mutton, lamb, or pork
- Tinned fish – watch out for bones and mash well
- Minced meat and chicken
- Peas, beans and lentils

Dairy

- Full-fat pasteurised cows' milk can be used to make weaning foods
- Pieces of pasteurised soft cheese, e.g. cottage cheese, cheddar (grated), ricotta
- Yoghurt

Fruit and vegetables

- Fruits, mashed or given as small and soft bite-size pieces when the infant is ready, e.g. soft apple, pear, plum, banana etc
- Mashed or cooked slices of vegetables, e.g. carrot, turnip, parsnip, broccoli cauliflower, peas etc

Preparation of infant foods during the second stage of weaning

1. At the start of this stage, gradually begin to make purées thicker by blending well, passing food through a sieve, but mixing with less milk.
2. Once the thicker purées are tolerated, move on to a mashed texture by mashing food with a fork and using less milk to mix.
3. In addition to mashed foods, encourage an infant to self-feed by providing soft finger foods as soon as interest in more textured foods is shown.
4. **Two different textures** can be offered in the same dish once an infant is able to consume purées and mashed foods, e.g. mashed and puréed textures offered in the same dish.
5. In general, butter/dairy spread should not be added to an infant's food. In exceptional cases, where adding butter may be of benefit, the advice of a dietitian should be followed.
6. **Do not add** sauces, gravies, salt, or sugar to an infant's weaning foods. Encourage savoury and plainer tastes.

Research indicates that early flavour and food experiences track into childhood and adolescence.

Infants naturally prefer sweet and salty tastes. It is important to provide foods without added sugar and salt to help decrease an infant's taste for foods high in sugar, salt and fat in later life.

Feeding an infant during this stage

1. Foods should be offered **before** an infant's milk feed during this stage.
2. Build up to three meals each day. Divide these into the morning, afternoon and evening.
3. Space meals and milk feeds apart as an infant gets used to having 3 meals in the day.
4. Offer 2-3 snacks or finger foods (but not more than this) in between main meals each day.
5. Never leave an infant alone during feeding.

Suitable finger foods during this stage of weaning

Breads & Pasta	One finger of toasted cheese on bread
	3 – 4 well-cooked pasta shapes, e.g. bow-ties, shells
	One piece of chapatti
	Small piece of a bread stick with cheese spread or hummus
	Small piece of naan bread or pitta bread with smooth peanut butter*
Fruits & Vegetables	Raw sticks of cucumber
	Small, soft pieces of fruit, e.g. pear, apple, banana, peach, nectarine, mango, melon
	Soft cooked sticks of vegetables, e.g. carrot, parsnip, green beans, turnip
	Soft cooked baby sweet-corn, mange-tout or sugar-snap peas
	Soft cooked florets of cauliflower and broccoli
	Soft cooked slices of pumpkin or butternut squash
Cheese	Stick of firm cheese, e.g. cheddar cheese
Meat & Poultry	Strips of freshly cooked meat or chicken

* Smooth peanut butter spread can be included in the diet of infants who have not been diagnosed with a peanut allergy and are more than 6 months of age.

WARNING!

An infant should never be left unsupervised with a finger food due to the risk of choking. See page 64 for advice on what to do if an infant is choking.

How much food should be given in a meal?

Parents/carers will learn the signs of an infant either being hungry or having had enough to eat. It is important that parents/carers pay close attention to these cues and get to know the infant's preferred routine (see page 54 for signs indicating that an infant has had enough to eat).

During Stage 2 you should aim to feed an infant 3 meals per day. Each meal should be approximately 2-4 tablespoons but this should be adjusted to match the infant's appetite.

Every meal/feed does not have to be finished. Infants have the ability to self regulate their intake and parents/carers should be encouraged to recognise when the infant is full.

What fluids should an infant be given during this stage?

- Continue to offer all fluids, other than breastfeeds, in a lidded beaker with a non-valved spout. The aim should be that by 12 months of age, **a non-lidded beaker** will be used for all drinks other than breastfeeds.
- Breastfeed on demand or, if infants are formula fed, give 3-4 milk feeds each day (approximately 600-800mls milk per day for formula fed infants).
- Cooled boiled water can be offered as extra fluid if needed.

Infants **do not need fruit juices**. However, if parents/carers choose to offer juices, only small amounts of well-diluted, unsweetened fruit juice (dilute 1 measure of pure juice to 8-10 measures of cooled boiled water) should be given from a beaker at mealtimes or with snacks from 6 months onwards.

Cows' milk should not be offered as the main milk drink until:

- A term infant is one year of age and;
- A pre-term infant is at a corrected age of 12 months old.

Low-fat milk should not be given to children under 2 years and skimmed milk should not be given before 5 years of age.

See page 25 for further information on fluids suitable during the first year of an infant's life.

The importance of gluten during this stage of weaning

What is gluten?

Gluten is a protein found in wheat, rye, barley and oats. Since gluten is present in these crops, it is found in many cereals and flours and the foods made from these, e.g. bread, pasta, crackers and breakfast cereals.

When should gluten be introduced?

All infants should be introduced to gluten at **about 6 months of age**. Introducing gluten before 4 months of age or after 7 months of age can increase the risk of developing coeliac disease and type 1 diabetes in later childhood. As such, it is important that parents/carers **introduce gluten according to best practice guidelines**.

How should gluten be introduced?

Very small amounts of gluten should be introduced at first. The amount and frequency of gluten-containing foods should gradually increase over the next 4-6 weeks.

Table 16. Practical Guidelines to Help Parents/Carers Introduce Gluten into their Infant's Diet

Week 1	Week 2	Week 3	Week 4
One portion of gluten-containing foods **every 3 days**	One portion of gluten-containing foods **every 2 days**	One portion of gluten-containing foods **every day**	Gluten-containing foods can be given to the infant every day on more than one occasion

How much gluten should be provided during each week of gluten introduction?

The amounts of the gluten-containing foods listed below are appropriate to feed infants during the introduction of gluten:

- 5-6 level teaspoons of gluten-containing baby cereal made with milk
- ½ slice of white sliced pan
- Small slice of wholemeal bread
- ½ Weetabix™
- 1 rusk
- 1 heaped teaspoon of couscous
- 2-3 cooked pasta shapes

A note on Coeliac Disease

Infants may present with coeliac disease following the introduction of foods containing gluten. Symptoms can include diarrhoea, failure to thrive and anaemia. If coeliac disease is suspected in an infant, the GP should organise the appropriate tests.

A gluten-free diet for life remains the only proven treatment for coeliac disease. Parents of infants with coeliac disease should consult a dietitian to ensure a nutritionally adequate diet for the infant.

Further information

- Reliable up-to-date information and support is available at www.coeliac.ie for all patients, their families and healthcare professionals

Sample 7-day meal planner for Stage 2 of weaning (6 – 9 months) after gluten has been introduced

Estimated portion size of each meal: 2-4 tablespoons

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Breakfast	Baby porridge[g] made with usual milk, i.e. breast milk or formula milk	™Weetabix[g] with usual milk, i.e. breast milk or formula milk	™Readybrek[g] made with usual milk, i.e. breast milk or formula milk	Baby porridge[g] made with usual milk, i.e. breast milk or formula milk	Baby rice made with usual milk, i.e. breast milk or formula milk	™Readybrek[g] made with usual milk, i.e. breast milk or formula milk	Baby rice made with usual milk, i.e. breast milk or formula milk
Dinner	Mashed spaghetti[g] bolognaise prepared with a small portion of meat	Mashed salmon (de-boned, fresh/tinned) with carrots, parsnips and potatoes	Mashed beef, cauliflower cheese and potatoes	Mashed lamb, carrots and potatoes	Mashed salmon (de-boned, fresh/tinned) with broccoli and potatoes	Mashed chicken, peas and potatoes	Mashed roast beef with potatoes and parsnips
Supper	Scrambled egg and toast[g]	Custard and fruit	Boiled eggs mashed with potatoes	Baked beans and fingers of toast[g] with butter/spread	Scrambled egg, beans and mashed potato	Custard and fruit	Fruit cup with plain yoghurt
Finger foods	Cube of cheese	Small pieces of very soft apple	Plain yoghurt	One rusk[g]	Plain yoghurt with a portion of fruit purée	Half banana	Piece of mandarin
Fluids	Infants should be breastfed on demand or, if formula fed, given 3-4 formula milk feeds each day (approximately 600-800mls). Cooled boiled water should be provided as additional fluid. See **Table 12** (page 41) for guidelines on the full amount of fluid an infant should have in a day during this stage of weaning. **Give ALL fluids from a lidded beaker with a non-valved spout.**						

[g] Indicates food contains gluten

This meal planner should only serve as a guide. Foods used, meal patterns and timing should be organised to suit the family and the infant's normal habits and routine. Fruits, vegetables, meats/fish and starches can be mixed and matched to add variety to the infant's diet.

Goals of Stage 2

Texture: Minced/mashed with soft lumps and soft finger foods

Number of meals per day: 3 meals per day. Approximate size of each meal 2-4 tablespoons

Milk feeds: Breastfeed on demand or give 600-800mls of formula milk daily. Space spoon and milk feeds apart.

4.4 Stage 3 of Weaning (9 – 12 months) – Lumpy Foods, Chopped Foods and Harder Finger Foods

What Should Parents/Carers Expect at this Stage?

At this stage, infants should be able for a wider variety of foods in greater textures, and should be able to manage more than 2 textures in one meal. Encouraging an infant to self feed is important at this stage. Infants will still be taking about 3 breast milk feeds or, if formula-fed, 3 formula milk feeds per day, with cooled boiled water making up the rest of their fluid requirements (see page 41). Infants will be taking all fluids, other than breastfeeds, in a lidded beaker with a non-valved spout. The aim is that by 1 year of age, infants will take all fluid, other than breastfeeds, from a non-lidded beaker or a cup.

What types of foods should be offered during this stage?

1. Increase the variety of foods to allow an infant to experience more tastes and flavours.
2. Suggestions for different foods that can be provided are found on page 61. These foods can be prepared depending on the texture an infant is ready for.

Preparation of infant foods during the final stage of weaning

1. At the start of this stage, move on from a mashed texture to lumpier foods by mashing less well and adding less milk so that the food becomes increasingly thicker and lumpier.
2. Once the lumpier foods are tolerated, move on to chopped foods by cutting foods into small bite-size pieces.
3. In addition to mashed foods, encourage an infant to self-feed by providing firmer finger foods as soon as the infant is ready.
4. **More than two different textures** can be offered in the same dish during this stage.
5. In general, butter/dairy spread should not be added to an infant's food. In exceptional cases, where adding butter may be of benefit, the advice of a dietitian should be followed.
6. If extra fluid is required, the infant's usual milk, cow's milk or vegetable water can be added to the food to achieve the correct consistency. **Do not add** sauces, gravies, salt, or sugar to an infant's weaning foods. Encourage savoury and plainer tastes.

Introducing lumpy foods from about 9 months of age is important to develop an infant's ability to:

- Speak
- Chew a wider variety of foods
- Increase the variety of their diet in later childhood

Feeding an infant during this stage

1. Base the meals and snacks around normal family foods and mealtimes.
2. Never leave an infant alone during feeding.

Suitable snack foods during this stage of weaning

Breads & Pasta	One finger of toasted cheese on bread
	3 – 4 well-cooked pasta shapes, e.g. bow-ties, shells
	One piece of chapatti
	Small piece of a bread stick with cheese spread or hummus
	Small piece of naan bread or pitta bread with smooth peanut butter*
	1-2 unsalted crackers
	Small portion of a plain scone
	1 plain rice cake
	1 small pancake
Fruits & Vegetables	Fruit slices, e.g. melon, banana, pear, apple, mango, orange, satsuma
	Chopped fruit, e.g. halved and deseeded grapes
	Dried soft pieces of fruit, e.g. apricots
	Soft cooked chunks of vegetables, e.g. carrot, parsnip, swede, sweet potato
Cheese	Small pot of plain natural yoghurt with some chopped/sliced fruit
	Small pot of plain fromage frais with some chopped/sliced fruit
	Cube/triangle/slice of firm cheese, e.g. cheddar cheese
Meat & Poultry	Strips of freshly cooked meat or chicken

* Smooth peanut butter spread can be included in the diet of infants who have not been diagnosed with a peanut allergy and are more than 6 months of age.

How much food should be given in a meal?

Infants should be offered 3 meals plus 2-3 nutritious snacks. The approximate size of each meal should be 4-6 tablespoons but this will depend on the infant's appetite.

What fluids should an infant be given during this stage?

- Continue to offer all fluid other than breastfeeds in a lidded beaker with a non-valved spout. The aim should be that by 12 months of age, **a non-lidded beaker** will be used for all drinks other than breastfeeds.
- Infants should be taking no more than 3 milk feeds daily (maximum 600mls milk per day).
- Cooled boiled water can be offered as extra fluid

By 12 months of age a non-lidded beaker should be used for all drinks other than breastfeeds.

Infants **do not need fruit juices**. However, if parents/carers choose to offer juices, only small amounts of well-diluted, unsweetened fruit juice (dilute 1 measure of pure juice to 8-10 measures of cooled boiled water) should be given from a beaker at mealtimes or with snacks from 6 months onwards.

Cows' milk should not be offered as the main milk drink until:

- A term infant is one year of age; and
- A pre-term infant is at a corrected age of 12 months old

Low-fat milk should not be given to children under 2 years and skimmed milk should not be given before 5 years of age.

See page 25 for further information on fluids suitable during the first year of an infant's life.

If there is any coughing or difficulty with a particular texture, simply move back a stage and wait for a few more days before trying the infant with a thicker texture.

Every infant is different and it is important to go at their pace.

Make meals according to the texture an infant is able for. Every infant will move through the different textures at slightly different rates.

Sample 7-day meal planner for Stage 3 of weaning (9 – 12 months)

Estimated portion size of each meal: 4-6 tablespoons

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Breakfast	™Readybrek made with usual milk, i.e. breast milk or formula milk	Baby porridge made with usual milk, i.e. breast milk or formula milk	™Weetabix with usual milk, i.e. breast milk or formula milk	Porridge made with usual milk, i.e. breast milk or formula milk	Baby porridge made with usual milk, i.e. breast milk or formula milk	™Weetabix with usual milk, i.e. breast milk or formula milk	™Readybrek made with usual milk, i.e. breast milk or formula milk
Dinner	Chopped chicken, broccoli and potatoes	Flaked cod, carrots and boiled potatoes	Flaked salmon, turnip, peas and potatoes	Minced lamb and potatoes with peas	Meatballs in tomato sauce with pasta	Chilli con carne with baked potato	Flaked trout, parsnip and potatoes
Supper	Wholemeal fingers of toast with baked beans	Boiled egg with fingers of toast with butter	Well-cooked pasta with slices of cold chicken and cucumber	1 egg omelette with cheese, slice of pitta bread and hummus	Baked beans and boiled potato	Fingers of toast with cheese spread and slices of tomato	Scrambled egg with fingers of toast
Snacks	Slice of melon Raisins	Yoghurt Rice cake with smooth peanut* butter	Piece of cheese Slices of apple	Slices of banana Fingers of toast with peanut butter*	Orange segments Small piece of plain naan bread	Chopped and deseeded grapes Pear chunks	Banana Dried apricots
Fluids	Infants should be having 3 milk feeds each day (maximum 600mls milk). Cooled boiled water should provide the remaining fluid needs of an infant (see page 41 for fluid requirements at this time). **By 12 months of age give ALL fluids, other than breastfeeds, from a non-lidded beaker or a cup.**						

* Smooth peanut butter spread can be included in the diet of infants who have not been diagnosed with a peanut allergy and are more than 6 months of age.

This meal planner should only serve as a guide. Foods used, meal patterns and timing should be organised to suit the family and the infant's normal habits and routine. Fruits, vegetables, meats/fish and starches can be mixed and matched to add variety to the infant's diet.

Goals of Stage 3

Texture: Lumpy foods, chopped foods and harder pieces of finger food.

Number of meals per day: 3 meals per day plus 2-3 snacks. Approximate size of each meal is 4-6 tablespoons.

Milk feeds: 3 milk feeds per day (maximum of 600ml (20oz). Space spoon and milk feeds apart.

What is the bottom line in terms of an infant who has been fully weaned onto solids?

1. *Self feeding and autonomy*

   It is important to allow infants to make a mess while learning to become independent feeders.

2. *Supervision of infant at all times during feeding*

   An infant should never be unsupervised when feeding due to the risk of choking.

3. *Meals should be based on the normal family diet and routine. Removing the infant's food portion before additions such as salt, sauces and gravy are made to family meals*

   By 12 months of age, infants should be eating normal healthy family foods. An infant's 3 meals and 2 - 3 snacks should be eaten when other family members are also eating.

4. *Red meats suitable for infants and young children are regularly included in an infant's diet*

   Red meat, such as beef, lamb, mutton and pork, can be offered all throughout the weaning process in a texture suitable to the stage that the infant is at. Red meat is an important source of iron.

5. *All infants should receive* ***5µg (200 IU) of vitamin D_3*** *as a supplement daily*

   Between 0-12 months, infants grow very quickly and sufficient vitamin D is required to form strong bones. An infant's diet, whether breastfed, formula fed or taking solid foods (or a combination of these), does not commonly include sufficient vitamin D therefore daily supplementation is required.

6. *All infants should be introduced to gluten at* ***about 6 months of age***

   Introducing gluten before 4 months of age or after 7 months of age can increase the risk of developing coeliac disease and type 1 diabetes in later childhood. The amount and frequency of gluten-containing foods should gradually be increased.

7. *Salt, gravy, stock cubes, sauces, and sugar are not added to an infant's meals*

   Avoid adding these to an infant's meals to protect their kidneys and to help lower their preference for high-fat, high-salt, and high-sugar foods in later life.

8. *A lidded cup or beaker with a non-valved spout is used for all drinks other than breastfeeds*

   Bottles should not be used for drinks past 12 months of age. An infant can start adjusting to a non-lidded beaker/ cup after they have become accustomed to using a lidded cup/beaker.

9. *For infants who are not breastfed, a maximum of 600mls milk is offered in a cup or beaker per day by 12 months of age*

   Intakes of milk greater then this can decrease an infant's appetite for solid foods. Food should be offered before milk at mealtimes.

10. *Full-fat pasteurised cows' milk can be offered from an infant's first birthday*

    Pasteurised full-fat cows' milk can be offered to a term infant from 12 months of age and to a pre-term infant from a corrected age of 12 months old. Unpasteurised milks should **never** be offered to infants or young children.

4.5 Questions about Weaning when an Infant is Over 6 Months of Age

Is my baby drinking too much formula milk?

Infants between 9 – 12 months of age should have about 3 milk feeds (maximum 600mls milk if not breastfed) per day. If an infant is drinking more than this, or in excess of requirements (page 41), try the following:

1. Keep to a routine of milk feeding. Space out milk feeds and meals
2. Offer food before milk at mealtimes
3. Offer 3 nutritious meals and 2-3 small snacks per day
4. Cooled boiled water should fulfil remaining fluid requirements

My baby is still using a bottle at 12 months of age. Is this okay?

No. By their first birthday, infants should be taking all their milk and cooled boiled water from a non-lidded cup or beaker. By not learning to use a cup, infants are more likely to remain in the 'baby' stage, develop dental caries and have delayed oral and speech development. Try the following:

1. Start by trying to omit any night time feed by one year of age
2. Introduce a cup of water for the infant at meals and, if not breastfed, a cup of milk at a milk feed
3. Try novelty or character cups as a 'reward'
4. Novelty straws may also help if there is continued difficulty

My baby is refusing to take lumpy foods. What can I do?

This can be as a result of delayed weaning. Try the following:

1. Parents/carers should have about **20 uninterrupted and relaxed minutes to feed** the infant
2. If the infant resists feeding, allow them to play with and explore the food themselves
3. Keep moving forward with the introduction of new textures – **Do not prolong any stage due to the infant's perceived food preferences**
4. If an infant struggles with a new texture, go back to providing the latest accepted texture for 2-4 days, then try moving on to the new texture again
5. Gradually **increase texture** by adding small pieces of food uniformly throughout the purée, increasing the size as the infant's confidence grows
6. If a food is refused once, re-introduce it a week later. **Never force a food that is being resisted**. Infants may need to be exposed to a food up to 15 times before it is accepted

If difficulties continue, speech and language therapy and dietetic input should be considered.

What can I do if my baby is constipated?

Treatment of functional constipation in infants should include the treatment of faecal impaction if present, treatment with oral medication if needed, parental education and close follow-up.

To help prevent the recurrence of constipation, try the following:

1. If powdered **infant formula** is the infant's usual milk, ensure it is **prepared correctly**
2. Make sure the infant is taking **enough fluid** (see page 41)
3. If the infant is meeting their fluid requirements, **additional fluids may be required**

Age of infant (months)	First line of action	If constipation fails to resolve
6 – 12	Offer 60-120mls cooled boiled water twice a day. Add stewed fruits, e.g. pear, plum, apple, mango, to porridge, baby rice and yoghurt 1-2 times per day. Include cooked vegetables and cereals (porridge, Ready Brek™, Weetabix™) in the diet.	Offer 60-120mls of a diluted juice that naturally contains sorbitol, e.g. prune, pear or apple juice, twice a day. Juice should be diluted in the ratio of 1 part juice to 3 parts water, i.e. 120mls diluted juice = 30mls pure juice and 90mls cooled boiled water.

See pages 42 and 43 for information on treating constipation in infants aged 0 – 6 months

4. Do **NOT** give pure bran to an infant

What can I do if my baby is a fussy eater?

Fussy eating relates to the rejection of foods and can potentially lead to the inadequate intake of certain nutrients. It is important to try and reverse this trend during infancy as early intakes have a far-reaching impact in adult eating patterns

Strategies to cope with fussy eaters include:

1. **Multiple exposures**

   Infants may need to be offered a particular food up to 15 times at any stage of weaning before they accept it, particularly for bitter tasting foods such as citrus fruits or vegetables from the brassicae family (cabbage, broccoli, turnip). Wait 5-7 days before offering the refused food again.

2. **Positive parent-child feeding style**

   There should not be any stress put on the infant to consume a particular food. A stressful feeding encounter will not produce a positive response in the infant. Make positive comments about the food and praise the infant when they eat well. Food should not be used as a means to teach a child to do as he/she is told.

3. **Mealtimes as social occasions**

   Set a good example by eating with your infant as often as possible. Other individuals eating the same food can bring about acceptance of the food by the infant. Try to avoid distractions such as watching television at mealtimes.

4. **Limit empty calorie snacks such as sweets/crisps/ biscuits/juice/fizzy drinks**

   An infant's stomach has a small capacity and large drinks and snacks before mealtimes will fill them up and reduce their appetite at mealtime. Infants naturally prefer sweet, high-fat foods and liking other complex flavours is learned. Offer nutritious savoury and plain foods to the infant, e.g. fruit, bread, yoghurts, cheese etc. **Do not use food as a reward**. Offering a pudding or sweet course as a reward will make these foods more desirable.

4.6 Choking

An infant should never be left unsupervised during meals and snacks due to the risk of choking. However, no matter how careful a parent/carer is, an infant may choke. Choking happens when a person's airway suddenly gets blocked so they cannot breathe. Their airway can be partly or fully blocked. An infant who is choking will be distressed and may be unable to cry, cough or breathe.

What to do if an infant (under 1 year of age) is choking

The following instructions should be used when advising parents/carers:

1. Lie the infant face down along your forearm or thigh with their head lower than their body. Support their head, jaw and neck
2. Give up to five firm slaps to the infant's back between the shoulder blades with the heel of your hand (the heel is between the palm of your hand and your wrist)

3. Check if the blockage has cleared. Look inside the infant's mouth and remove any obvious blockage. **Do not poke your fingers into the infant's mouth unless you can see and reach the blockage**. You may push it further in
4. If the airway is still blocked lay the infant along your forearm on their back with their head low, supporting their back and head, and give up to five chest thrusts. **Chest thrusts** can be performed by placing two fingers over the lower half of the infant's breastbone, below an imaginary line between the nipples. Using two fingers, push inwards and upwards (towards the head) against the infant's breastbone, one finger's breadth below the nipple line
5. Check if the blockage has cleared after each thrust, by looking inside the infant's mouth and removing any obvious blockage. Do not poke your fingers into the baby's mouth unless you can see and reach the blockage as you may push it further in
6. Keep doing 5 back blows and 5 chest thrusts until the object pops out and the infant begins to breathe again

7. If the infant becomes unresponsive, call for help and send someone to **dial 999 or 112**

   Stay on the phone and listen carefully for advice:

   a. You must begin CPR (Cardio Pulmonary Resuscitation). The emergency operator will guide you

   b. If during CPR you see the object, remove it with your fingers but do not place your fingers in the infant's mouth if you cannot see the object

WARNING!

Even if the object is expelled, advise parents/carers to get medical help. Part of the object might have been left behind or the infant might have been hurt by the procedure.

The instructions outlined only apply if a child is under 1 year of age. For a child over 1 year old the Heimlich manoeuvre can be used.

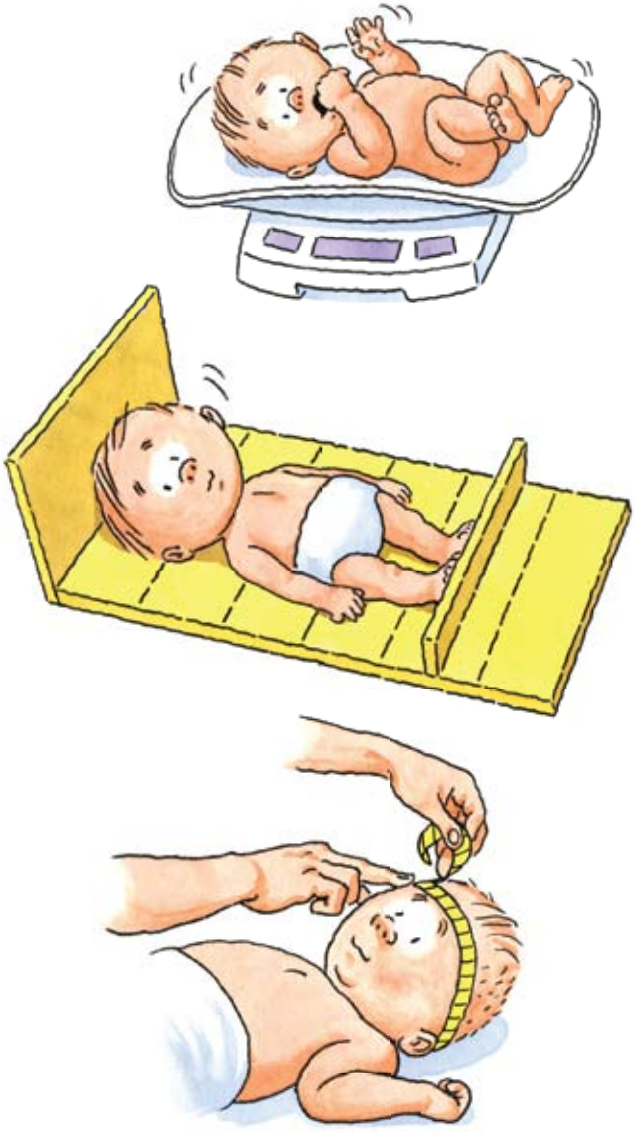
Adapted from the HSE - CSAP (2012): *Strangulation, Choking and Suffocation* http://www.hse.ie/eng/services/healthpromotion/ChildSafety/suf_choke_strang.html Accessed 30/10/12

and

NHS (2012): *What should I do if a baby is choking?* http://www.nhs.uk/chq/Pages/2300.aspx?CategoryID=72&SubCategoryID=722 Accessed 07/08/12

Chapter 5

Measuring an Infant's Growth



The importance of monitoring growth in infancy

Measuring growth is an important part of an infant's health and development check. Maintaining a healthy growth throughout infancy is a critical indicator that infant feeding is going well. Slow, delayed or excessive growth during the first year of life may have an important impact on health in later years.

Using the correct growth chart to measure growth

Growth charts which are age and sex specific must be used as there will be differences in growth in boys and girls, and of infants and children at various stages. Ireland has no growth charts specifically developed from data on Irish infants aged from birth to 12 months. In 2010, the Department of Health made the decision to introduce the new UK-WHO Growth Charts for Irish infants and children up to 4 years of age. These growth charts will be implemented nationally from January, 2013.

The World Health Organization (WHO) Child Growth Standards for infants and children up to the age of 5 years were published in April 2006. They are based on the growth of healthy breastfed children in optimal conditions from six different countries (USA, Norway, India, Ghana, Brazil, and Oman). The WHO Growth Standards have been developed into age-based charts for height, weight and body mass index (BMI). The new UK-WHO Growth Charts have adopted the WHO Child Growth Standards from age 2 weeks. The birth section of the UK-WHO charts is based on UK 1990 pre-term and term birth data as the WHO growth charts do not include pre-term data.

Growth patterns in breastfed and formula fed infants

From birth to 6 months of age, breastfed infants grow more quickly compared with formula fed infants. However, from 6 to 12 months of age, breastfed infants grow more slowly. The growth pattern of breastfed infants is optimal. Therefore, the new UK-WHO Growth Charts are based on the growth rates of breastfed infants.

What does a growth chart measure?

A growth chart will provide information on the following:

- **Length-for-age:** Indicates whether an infant is an appropriate length for their age
- **Weight-for-age:** Indicates whether an infant is an appropriate weight for their age
- **Weight-for-length:** Indicates whether the weight and length of an infant are in proportion
- **Head circumference-for-age:** Provides information about brain development

How often should an infant's growth be measured?

Infants' weights will naturally vary. Weighing an infant too frequently in the first year of life may cause unnecessary worry. For healthy infants and children, the National Core Child Health Programme Review Group (2005) recommends **mandatory growth assessments** at:

1. Birth
2. 6 – 8 week check
3. Start of primary school

The report also states that it is accepted good clinical practice for **infants to be weighed and measured at opportunistic times** including routine health checks and scheduled immunisations. In the first year of life, routine health checks are carried out at the postnatal visit, and when the infant is 3 months old and 7-9 months old. Additional health checks are scheduled at 18-24 months and 3.25 -3.5 yrs old.

Measurements will need to be taken more frequently if there are concerns over the infant's growth.

What is needed to measure growth?

- Weight: Class III Clinical Electronic 'self zeroing' Scales which provides weight to the nearest 10grams
- Length: Length board, preferably, or mat which measures to the nearest 0.1cm. A second person will be required to hold the infant's head/foot while the other individual's takes the measurement.
- Head Circumference: ''Lasso-o'' tape or another non-stretchable plastic or disposable paper tape measure
- Growth charts – UK-WHO Growth Charts[1] should be used nationally
- A warm room
- Towel to be put on scales and length board
- Antiseptic wipes to clean the scales, length board and tape between each infant
- Baby changing facility

To correctly measure growth, the necessary equipment must be calibrated regularly. In addition to this, it is vital that all staff involved in assessing growth are adequately trained.

How to do a growth assessment?

Weight

1. Advise parents/carers to feed the infant as per their normal routine prior to weighing.
2. Infants should be weighed naked to get an accurate measurement.
3. A Class III Electronic Scales which has been regularly calibrated should be used.
4. Scales should be set to zero before placing the infant on the scales.
5. Weight should be recorded to the nearest 10g ($^{1}/_{100}$th of a kg).

Length

1. Infant should be lying down naked on a length board or mat.
2. Align infant's head to the top of the length board or mat.
3. Gently apply some pressure to straighten out the infant's legs.
4. Measure from top of the head to the bottom of heel.
5. Measure to the closest 0.1cm.
6. Measure length twice and get an average of both figures:

$$\frac{(\text{Measure 1} + \text{Measure 2})}{2}$$

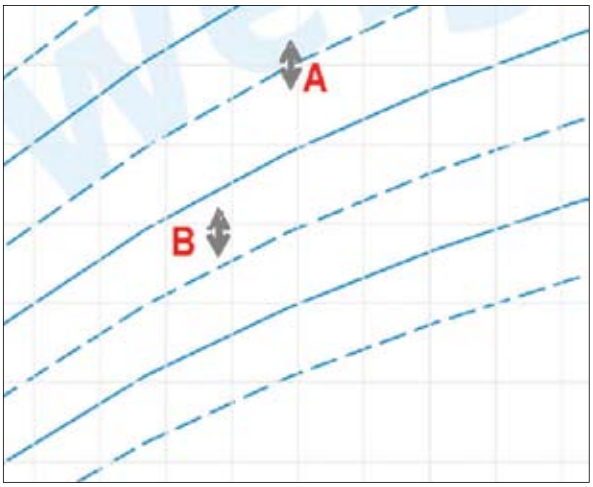
Head circumference

1. Use a narrow non-stretchable or disposable measuring tape.
2. Remove any head wear.
3. Measurement should be taken where the head circumference is widest.
4. Take the largest of 3 consecutive measurements to the closest 0.1cm as the final measure.

[1] Available from Royal College of Paediatrics and Child Health: http://www.rcpch.ac.uk/Research/UK-WHO-Growth-Charts

Recording measurements

1. Record the measurement and date in ink, plot in pencil using a 'dot'- do not join up
2. Write the infant's age in weeks for the first 12 months
3. If the point is on the centile line or within a ¼ space of a centile line (**A**) – the infant is described as being 'on the x percentile', e.g. on the 91st centile
4. If the point is between 2 centile lines (**B**) – the infant is between 'the X and Y percentile', e.g. between the 75th and the 91st centile.



www.growthcharts.rspch.ac.uk

Age errors are the most common sources of problems when plotting. To avoid this, use a calendar to calculate age.

What do the centiles show?

Centiles are the most commonly used clinical indicator to assess the size and growth patterns of an individual child. Centiles rank the position of an individual by indicating what percentage of the reference population the individual would equal or exceed, e.g. an individual ranked at the 75th centile would exceed 75% of the reference population. Half of all children will be between the 25th and the 75th centile.

The 50th centile has been de-emphasised in the UK-WHO Growth Charts. This is to demonstrate that an infant growing normally may be positioned elsewhere on the chart as parents/carers tend to expect all healthy children to be on the 50th centile.

Situations where further investigation of growth patterns is recommended

Slow or excessive growth and/or weight gain must be corrected early to reduce health risks.

Referral for further investigation is recommended if an infant:

- Is below the 0.4th centile for weight, length, height or head circumference
- Is above the 99.6th centile for head circumference
- Has crossed two or more centiles between two measurements, e.g. weight and length or weight and occipital-frontal circumference (OFC)
- Has crossed two or more major centiles in terms of weight and height

chapter 6

Caring for an Infants' Teeth

Even before first teeth appear, oral care for infants is important.

Bottles and an infant's teeth

Prolonged contact of teeth with milk feeds, especially during sleep, can cause tooth decay.

- Infants who are not breastfed should be given a bottle at feed times only
- Infants who are not breastfed should not be given a bottle to take to bed, and should never sleep with a bottle in their mouth.

Soothers and an infant's teeth

- If an infant uses a soother or dummy, make sure it is clean before use.
- Infants should never be given a soother that has been dipped in sugar, syrup, honey, jam or other sweet foods.

Sugary foods/drinks and an infant's teeth

To help prevent tooth decay, cariogenic high-sugar foods should not be included in the infant diet. Such foods include:

- Sugary or carbonated drinks
- Juices, including juice drinks, and sweetened and unsweetened juices
- Sugary foods, including chocolate and sweets

Brushing an infant's teeth

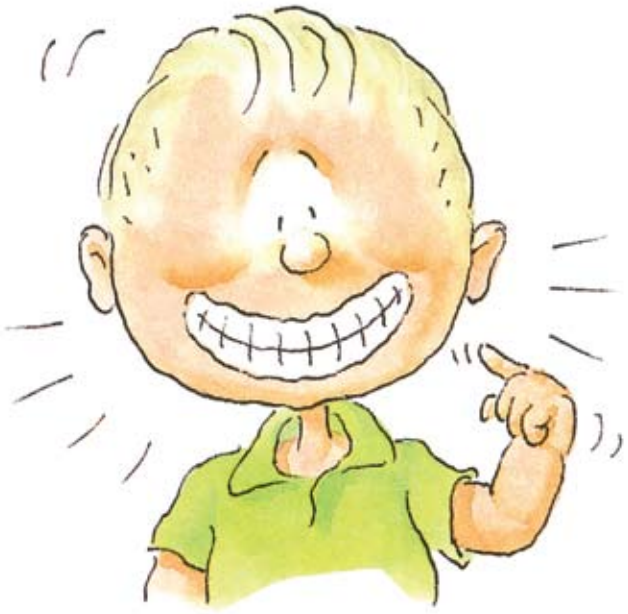
Advice to parents/carers on bushing their infant's teeth should include:

- Brush an infant's teeth without toothpaste as soon as the first tooth appears
- Brush in the morning and at bedtime with a small soft infant toothbrush and water

Excessive consumption of fluoride is toxic, and so, due to the risk of swallowing, toothpaste is not recommended for children under 2 years.

Teething Tip!

Keep raw sticks of cucumber in the fridge for an infant to chew on during teething – the coolness soothes an infant's gums.



Appendix A. Prescribing Medication for Breastfeeding Mothers

Studies suggest that 90-99% of new mothers receive medications in the first week postpartum. Use of medications is one of the major reasons why women stop breastfeeding prematurely; therefore, where possible, it is important to find alternative medications that are compatible with breastfeeding.

Drugs contraindicated in breastfeeding (HSE, 2008)

Please note that this is not an exhaustive list, but includes more commonly prescribed medications unsuitable for breastfeeding mothers.

- Amiodarone
- Antineoplastic agents
- Chloramphenicol
- Ciprofloxacin
- Doxepin
- Ergotamine
- Gold salts
- Iodides
- Indomethacin
- Lithium
- Oestrogens (will decrease milk supply)
- Pethidine (multiple doses)
- Radioactive isotopes
- Vitamin D (high dose)

Resources to assist appropriate prescription to breastfeeding mothers

Note: It is essential to use the most recent edition of any publication.

- Health Service Executive, 2011. *National Medicines Information Centre*. [online] Available at: http://www.nmic.ie [Accessed 16th December 2011].
- Hale, T.W., 2010. *Mini Medications and Mother's Milk*. 14th ed. Amarillo, TX 79106: Hale Publishing.
- Hale, T.W. and Berens, P, 2010. *Clinical therapy in Breastfeeding Patients*. 3rd ed. Amarillo, TX 79106: Hale Publishing.
- *Prescribing for breastfeeding mothers* Available to download from www.breastfeeding.ie

Appendix B. Acknowledgements

This guidance document is based on a recent Food Safety Authority of Ireland (FSAI) report (*Scientific Recommendations for a National Infant Feeding Policy, 2nd Edition 2011*) and sincere thanks go to all the members of the Expert Working Group involved in the production of this, for their enthusiasm and time. One of the main recommendations of this Expert Working Group called for the production of an accompanying guidance document for healthcare professionals that is based on the 2011 scientific report. This report is the outcome of that recommendation and it outlines all the practical aspects of best practice in infant feeding in Ireland.

We would also like to thank the many experts who contributed, including those members of the Scientific Committee and Public Health Nutrition Scientific Sub-committee of the Food Safety Authority of Ireland for their critical review and guidance on both documents. Finally, special thanks go to the researchers, Dr Annalouise O'Connor, Ms Annemarie Bennett and Ms Sinéad Ní Bhriain, who worked on this report.

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Notes

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